FINAL REPORT

1997 LEHIGH PHASE II PROJECT
MT DEQ No. 94-002

Judith Basin County, Montana

Site Located in Central, Montana

T15N, R12E
SE¼ of Section 16
NE¼ of Section 21

June 10th, 1997

Spectrum Engineering
1413 4th Avenue North
Billings, Montana 59101

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1997 LEHIGH PHASE II PROJECT

1. INTRODUCTION

1.1 Project Description

The 1997 Lehigh Phase II Project permanently neutralized the acid generating potential of 49,858 tons of coal waste which had been placed in a large disposal area near Lehigh during a previous AMR project. This was the third phase of a three year project. During the project 6,473 tons of lime kiln dust was acquired from Continental Lime's plant near Townsend and hauled to the Lehigh site for mixing with the coal waste. This phase of the project was handled as a change order to the 1996 Lehigh Phase II contract which had been awarded to Shumaker Trucking and Excavating.

1.1.1 Location and Access

The Lehigh Project is located 3½ miles southwest of Windham in the SE¼ of Section 16 and NE¼ of Section 21 T15N, R12E in Judith Basin County. General access is by proceeding 67 miles east from Great Falls on Highway 87 to its junction with Secondary 541 near Windham. Then proceed southwest on 541 approximately one mile to an improved gravel road which branches off the right side of the highway and continues to the southwest. The abandoned town of Lehigh is located approximately 2.8 miles up this gravel road. A large concrete loadout structure marks the location of the mine at Lehigh. The Lehigh Project area is found on the 7½ minute USGS quadrangle named Windham, Mont. at latitude 47°03'05" and longitude 110°12'18". The 1997 Lehigh Phase II Project treated the northeast end of the project area.

1.1.2 Land Ownership

The site is owned by the following landowner:

Gayle Evans
P.O. Box 3156
Stanford, MT 59479
(406) 566-2509

1.1.3 History

A history of mine development in the area surrounding this site can be found in the *Historical and Cultural Survey of Selected Abandoned Mine Sites in the State of Montana* by Historical Research Associates, Missoula, Montana, dated March 19, 1982. The section covering the Hughes Complex - Mine F refers to this site. The Seaman Mine was the first mine of note in this area.

Previous reclamation work on this site occurred during the Lehigh Abandoned Mine Reclamation Project which was bid on October 31, 1989. This contract was awarded to Montgomery Construction of Hilger, Montana. The main objective of this project was to remediate impacts associated with a large coal slack pile located in a coulee near Lehigh. This pile was the main coal waste disposal area for the Cottonwood Coal Company's underground mine at Lehigh which accessed the coal seam from a 208 foot deep shaft and began production in 1914. The Cottonwood Coal Company was a subsidiary of the Great Northern Railroad. The mine was developed to supply coal to the railroad after production out of their mines in Sand Coulee and Stockett proved inadequate. Its peak production years were from 1918-1919. In 1921, the mine

at Lehigh was closed after a labor dispute. The mine closure led to the abandonment of the town which had reached a population of 5000 people.

The mine and wash plant at Lehigh were capable of producing over 2500 tons/day. A conveyor was originally used to carry waste products from the facilities to the disposal area. In 1917, an aerial tramway was constructed. It is estimated that the disposal area eventually received as much as 225,000 cubic yards of wash plant and mine wastes. The pile bridged a coulee in the North Fork Sage Creek drainage creating an impoundment. Water seeping through the pile eventually created an acid mine drainage problem which effected 10-15 acres of range land. In 1983, the AMR Program attempted to reduce the acidic seepage by placing a heavy clay liner on the upstream face of the pile; however, this liner was ineffective. The Lehigh Abandoned Mine Reclamation Project in 1989-1990, moved a reported 200,400 cubic-yards of this waste pile to a 10 acre disposal area located on the slopes of the coulee adjacent to the waste pile. This material was compacted in lifts, graded, limed at the rate of 20 tons/acre, covered with an 8-inch layer of salvaged soil, and revegetated.

Potential problems resulting from the reclamation of the Lehigh coal waste pile were first observed by AMR staff during the summer of 1991. At that time, vegetation was in moderate to good condition on the majority of the reclaimed site: but, several areas were either unvegetated or exhibited poor growth. In addition, much of the reclaimed coulee bottom was unvegetated and salt efflorescence was observed along the banks of the coulee.

In 1991 and 1992, Chen-Northern, Inc. was assigned several tasks designed to evaluate acidic seeps and the potential for soil acidification in the area where the 1989-1990 project had deposited the Lehigh coal wastes. Chen-Northern concluded that additional monitoring and study would be required to select the most suitable remediation alternative. However, their February 1992 report states; "that acidification of the coversoil will eventually occur. This process will probably occur over an extended period of time and the resulting effects on the vegetative cover may not be realized for many years." Their preliminary recommendation was to move the coal waste to a more suitable location and to encapsulate the coal waste in a constructed disposal site which would be excavated and could provide 4-feet of capping material.

In May 1994, Dr. Doug Dollhopf, et al from the Reclamation Research Unit at Montana State University were contracted to determine the total lime requirement to permanently neutralize the entire coal waste mass. They recommended that 307 tons of $CaCO_3$ or lime kiln dust per 1000 tons of coal waste be applied. The study estimated that 205,550 cubic yards of coal waste would be neutralized if the entire mass was treated.

Due to the limited amount of lime kiln dust that could be obtained in any year, the project had to be divided into several phases. The first phase of the Lehigh Project was completed in 1995. The initial phase was designed to permanently neutralize the acid generating potential of 92,000 cubic-yards of coal waste; however, only a measured 46,712.2 tons (approx. 46,000 loose cubic-yards) of coal waste was actually treated during the project. A supply of lime kiln dust was purchased from Continental Lime at a bid price of $6.00 per ton FOB at the plant. Under a separate contract, 16,970 tons of lime kiln dust was hauled from the Continental Lime's plant near Townsend and placed in storage pits located near Lehigh. During construction, Continental Lime's Indian Creek Plant supplied an additional 2380.71 tons of lime kiln dust. Spectrum Engineering prepared the bid packages and performed the construction management for the first phase which was limited to the west end of the Lehigh Site. M.K. Weeden Construction was awarded the main contract to neutralize the coal waste at Lehigh. A pug mill was used to mix the lime and coal waste. Temporary lime storage pits were used during this

phase of the project. The average neutralization rate for this phase of the project was 285 tons of lime (100% calcium carbonate equivalence) per 1000 tons of coal waste or 339 tons of lime kiln dust per 1000 tons of coal waste.

Lehigh Phase II was completed by Shumaker Trucking and Excavating in 1996. Due to the problems which had previously been experienced, the pug mill mixing and storage pit concepts were discarded. During this phase, 86,832 tons (approx. 87,000 loose cubic-yards) of coal waste was processed with lime kiln dust at an average neutralization rate of 180 tons of lime (100% calcium carbonate equivalence) per 1000 tons of coal waste or 182 tons of lime kiln dust per 1000 tons of coal waste. The neutralization rate was reduced for the second phase because weekly composite samples from the first phase indicated that the processed material had been consistently over limed. The change reduced the theoretical confidence level for having all possible samples completely neutralized from 90% to 50%. Spectrum Engineering again performed the design and construction engineering functions.

The Lehigh Phase II work was completed by Shumaker Trucking and Excavating in 1997 as a change order to their 1996 contract. During this phase, 49,858 tons (approx. 50,000 loose cubic-yards) of coal waste was processed with lime kiln dust at an average neutralization rate of 131 tons of lime (100% calcium carbonate equivalence) per 1000 tons of coal waste or 129 tons of lime kiln dust per 1000 tons of coal waste. The neutralization rate for the final phase was based on Dr. Doug Dollhopf sampling and analysis of the specific area using a theoretical 50% confidence level for having all possible samples completely neutralized. Spectrum Engineering again performed the design and construction engineering functions.

For the entire project, a total of 183,000 loose cubic-yards of coal slack was neutralized at a total construction and materials cost of $2,496,784. This total represents the entire quantity in all known areas. Weekly composite samples indicated that a significant excess neutralization potential was added to the processed material.

AVERAGE OVER LIMING RATE

Phase I - 1995	173 tons/1000 tons of coal waste (339-166)
Phase II - 1996	89 tons/1000 tons of coal waste (113-78)
Phase II - 1997	51 tons/1000 tons of coal waste (97-28)

1.2 Project Objectives

The project objective was to permanently neutralize the acid generating potential of coal waste associated with a large abandoned coal mine at Lehigh. The 1997 Lehigh Phase II work was the third of a three phase project. It was designed to address 49,858 tons or approximately 50,000 loose cubic-yards of coal waste. The treated areas and the process area were covered with soil and revegetated.

2. RESPONSIBLE PARTIES

2.1 Contractor

The successful bidder was Shumaker Trucking and Excavating Contractors, Inc.. Their address is shown below:

Shumaker Trucking and Excavating Contractors, Inc.
P.O. Box 1442
Great Falls, MT 59403-1442
Phone: 406/727-3537

Shumaker Trucking sub-contracted the kiln dust haulage portion of the work to:

TranSystems, Inc.
1501 Third Street NW
Great Falls, MT 59404
Phone: 406/727-7500

2.2 Reclamation and Engineering Plan

Spectrum Engineering was assigned the responsibility of preparing engineering plans and specifications for this project. Dr. Doug Dollhopf, et al from the Reclamation Research Unit at Montana State University provided those specifications concerning coal waste neutralization.

Spectrum's address is shown below:

Spectrum Engineering
1413 4th Avenue North
Billings, Montana 59101
Phone: 406/259-2412

2.3 Quality Control Inspection

Spectrum Engineering performed the quality control inspection. Bill Maehl performed project engineering functions. Dick Lohrenz served as construction inspector.

2.4 MWCB Program Coordination

The MWCB Project Manager was Joel Chavez, Montana Department of Environmental Quality, Mine Waste Cleanup Bureau.

3. CHRONOLOGICAL LISTING OF EVENTS

3.1 Pre-Bid Conference

The pre-bid conference for the Lehigh Phase II Project was held on July 2nd, 1996. The 1997 work was completed as a change order to the previous work.

3.2 Bid Date

The bid opening date for the Lehigh Phase II Project was July 11th, 1996. The 1997 work was added as a change order to the contract awarded under this bid.

3.3 Lowest Bids

Shumaker Trucking and Excavating was awarded the Lehigh Phase II Project for a low bid of $841,400.00. The 1997 work was later added as a change order. The construction contract did

not include the purchase of lime kiln dust. The 1997 work used a combination of the original unit rates and negotiated rates. See the Proposed Costs spreadsheet in Attachment 1.

3.4 Contract Agreement

The Contract Agreement for the Lehigh Phase II Project was signed July 24th, 1996. The Notice to Proceed was issued for a starting date of August 5th, 1996. The original term of the contract was one-hundred and twenty (120) consecutive calendar days. This contract was amended to give Shumaker a winter/material shutdown and an additional 75 days to complete the remainder of the work at the site.

3.5 Construction Start-up

A Pre-Construction Conference for the 1997 work was not required. Following the winter/lack of kiln dust material shutdown, the Contractor started moving equipment back onto the Lehigh site on March 17, 1997. Shumaker Trucking and Excavating started the final phase of work on March 19th, 1997.

3.6 Change Orders

Two Change Orders were written for the 1996 phase of this project increasing the contract amount to $932,644.65. These changes are discussed in the Lehigh Phase II Project Final Report dated December 18th, 1996. Change Orders Nos. 3 and 4 were written to cover the additional work in 1997. They increased the contract amount to $1,428,760.36. Copies of the 1997 Change Orders are included in ATTACHMENT 2 of this report.

Change Order No. 3 was issued to increase the contract amount by $382,886.70 which was the total estimated cost for completing the final phase of the project. The contract time was also increased by 75 days. Original bid unit rates were used where they remained applicable.

(1) MPDES Permit renewal - $650.00
(2) Remobilization - $62,620.00
(3) Silt Fence (500' x $6.00/LF) - $3,000.00
(4) Provide Water (350 Kgal x $30/Kgal) - $10,500.00
Decreased $20/Kgal based on negotiated cost reduction
(5) Remove/replace topsoil (5500 CY x $1.75/CY) - $9,625.00
(6) Deliver kiln dust (4810 tons x $25.00/ton) - $120,250.00
Increased $3.00 per ton based on TranSystems quote for single shift operation.
(7) Excavate & mix coal/kiln dust (4810 tons x $19.27/ton) - $92,688.70
Increased from $17.00 per ton of lime because liming rate was decreased from 180 tons of lime per 1000 tons of coal waste to 130 tons of lime per 1000 tons of coal waste. Consequently, more tons of coal waste must be handled per ton of lime kiln dust.
(8) Neutralize coversoil (4.5 ac x $3200.00/ac) - $14,400.00
(9) Import coversoil (5500 CY x $5.50/CY) - $30,250.00
(10) Fertilize/seed/mulch (12 ac x $1200/ac) - $14,400.00
(11) Pull lime truck (90 hrs x $125/hr) - $11,250.00
Required because spring working conditions make access up the hill difficult.
(12) Transport coal to mixing area (2 moves x 22,850 tons x $0.29/ton/move) - $13253.00
Required for tonnage on the northeast side of the drainage because crossing the drainage to process the coal waste was not practical.

Change Order No. 4 was issued to increase the contract amount by $113,229.01 to a total of $1,428,760.36. It was required to adjust estimated quantities to actual measured quantities for completed bid items. The adjustments were as follows:

(1) A MPDES Permit renewal was not required - the decreased amount was $650.00

(2) The quantity of silt fence increased by 2300 feet - $13,800

(3) Due to moisture in the coal waste water usage decrease by 50 Kgal - the amount of decrease was $1,500.00

(4) The quantity for remove and replace coversoil increased by 9,000 CY - $15,750.00

(5) An additional 1,663.24 tons of lime kiln dust was delivered because more coal waste was encountered - $41,581.00

(6) An additional 1,663.24 tons of lime kiln dust was incorporated because the coal waste quantity increased by 13,000 tons - $32,050.63

(7) An additional 1.23 acres of coversoil neutralization was required - $3,936.00

(8) An additional 2,338 CY of coversoil was imported to cover the added acreage - $13,024.00

(9) The acreage for seed, fertilize and mulch went up from 12 acres to 17.7 acres - $6,840.00

(10) Pulling lime trucks required 59 less hours than anticipated - the decreased amount was $7,375.00

(11) Transporting coal to the mixing area took only one move because processed coal waste was not replaced on the NE side of the drainage (decrease of $6,626.50). However, part of this savings was offset by a requirement to handle an additional 8,272 tons (increase of $2,398.88). The net decrease was $4,227.62

Changes ordered over the entire project increased the contract price from $841,400.00 to $1,428,760.36. This was an increase of $587,360.36 in the price.

3.7 Work Stoppages

A winter/material shutdown extended from October 2nd, 1996 to March 19, 1977. After the shutdown, Shumaker Trucking and Excavating used 52 calendar days to complete the final phase of the project on May 9th, 1997. During this period, two scheduled work days were lost due to weather. The Contractor had personnel and equipment operating on 44 days in 1996 and on 36 days in 1997.

3.8 Requests for Payment

Three payment requests were made during this project. A copy of Pay Request No. 3 which was the only one made during the 1997 contract period is included in ATTACHMENT 3. The amount of work completed for each request is shown below:

No. 1	08/05/1996 to 09/01/1996	$604,757.53
No. 2	09/01/1996 to 10/03/1996	$327,887.12
No. 3-Final	10/04/1996 to 05/09/1997	$496,115.71

With release of the retainage, the amount due on the final payment was $505,442.16.

3.9 Substantial Completion

The date of Substantial Completion was May 9th, 1997.

3.10 Final Completion and Approval

Joel Chavez of the MDEQ-MWCB made periodic inspections of the work throughout the project. He made a final inspection on May 6th, 1997. He was accompanied by Bill Maehl and Dick Lohrenz from Spectrum, Gayle Evan's brother-in-law representing the landowner, and Duane Shumaker representing the Contractor. The inspection resulted in a dam site which had been cleaned-out and seeded during Phase I being reseeded. Otherwise the project was acceptable to all parties. Final completion will be one year from project completion or May 9, 1998.

3.11 Final Payment

Final payment was made to the Contractor in June 1997. A copy of the payment request has been included in ATTACHMENT 3.

4. CONSTRUCTION

4.1 Description of Project Plan

The construction plan for treating the last 4.28 acres of coal waste situated at the east end of the project area followed the same basic approach used during the 1996 Phase II Project. Data from the test holes that were dug and sampled prior to Phase I of the project suggested that 22,850 tons of acidic waste was situated on the northeast side of the creek and another 14,000 tons was still on the southwest side of the creek. This material would be neutralized with lime kiln dust and then replaced. Approximately 9-inches of coversoil would placed over the regraded material so viable vegetative cover could be reestablished. Samples from the NE side indicated that 100 tons of lime per 1000 tons of waste would provide an adequate confidence level that even the most acidic materials in this area would be sufficiently neutralized; while, the tonnage on the SW side of the creek would be neutralize at 180 tons of lime per 1000 tons of waste. Phase II -1997 work was to consist of renewing the MPDES permit; mobilizing to the site; installing silt fence; providing water; salvaging, stockpiling, and replacing coversoil; delivering lime kiln dust from Continental Lime in Townsend to the project site; excavating 36,850 tons of coal waste, mixing it with 4,810 tons of lime kiln dust, and then replacing the neutralized coal waste; importing coversoil, neutralizing coversoil with $CaCO_3$; and revegetating all disturbed areas. Provisions were included to assist lime delivery trucks by towing and to haul coal waste on the NE side of the creek to the processing area. The work items are summarized as follows:

(1) **MPDES Permit** - The MPDES Storm Water Control Plan and Permit secured for the Phase II Project would be renewed.

(2) **Mobilization** - At a minimum, a water truck, revegetation equipment, sealable hauling units for lime kiln dust transport, scrapers or other excavation equipment for coal slack excavation, and mixing equipment for incorporation of the lime with the coal waste would be mobilized to the site. To prevent the spread of noxious weeds into the project area, equipment and vehicles would be cleaned with high pressure water before moving the equipment into the project area. The contractor had move completely off the sit during the shutdown and would need to remobilize.

(3) **Erosion Control Protection** - Approximately 500 feet of silt fence would be installed along the bottom of the construction area.

(4) **Provide Water** - A water truck would be available at all times for haul road dust suppression and for the lime mixing operation. Total water usage was estimated at 350,000 (350 Kgal) gallons. The water would be obtained from a mine shaft near the concrete loadout structure at the foot of the hill to the south of the project area.

(5) **Remove, Stockpile and Replace Coversoil** - A total of 5,500 cubic yards of coversoil would be stripped, stockpiled and replaced as the bottom layer of soil. Coversoil would be recovered from the coal waste removal areas, from the lime kiln dust treatment area, and from the staging and stockpile areas.

(6) **Deliver Lime Kiln Dust From Continental Lime To Project Site** - The DEQ-MWCB had purchased a supply of lime kiln dust from Continental Lime. This supply of the lime kiln dust was located approximately 6 miles west of Townsend, in a storage pit in Section 33, T7N, R1E, Broadwater County, Montana. This area can be accessed by leaving Highway 287 just north of Townsend across the Missouri River, turning on the paved road to the west of Highway 287 and proceeding to the Continental Lime Plant.

The Contractor would be required to load the lime kiln dust at the kiln reject pile or at the pit and to deliver it to the Lehigh site. Lime kiln dust is a fine powder. It had to be loaded and hauled in a manner that prevented release of this material. If belly dump trailers were used to transport the material, rubber seals would be required on the gates and traps would be installed over the top.

(a) PIT MATERIAL - "Boulders" of kiln dust may be found in the storage pit at Continental. These boulders must be set aside at the site and not be transported to Lehigh. The Contractor would be required to have either a screening plant capable of supplying 1-inch minus material or a grizzly on the front of the loader bucket capable of supplying 1-inch minus material. This material has an average 84% calcium-carbonate equivalent. About 25% of the lime kiln dust would be supplied from the pit.

(b) KILN REJECT MATERIAL - A pile of reject material was located at the plant. The quantity was estimated at 4,900 tons (106% calcium-carbonate equivalent). Only 1-inch minus material would be loaded from this pile.

The Contractor would be required to supply his own certified scales with printable weight slips at the Lehigh site for weighing all trucks carrying lime to Lehigh. All trucks would be weighed full coming in and empty going out. The net weight of lime delivered to the project site would be the basis for lime payment. A total of 4,810 tons of lime kiln products would be hauled to the Lehigh site. The truck driver would be required to tell the Engineer upon site arrival which source his load originated from for mixing purposes.

Because of the Spring schedule and the condition of the access road leading to the Lehigh site, provisions for towing trucks up to site would be required.

(7) **Excavate Coal Waste, Neutralize With Lime Kiln Dust and Replace** - During the 1996 phase of this work, Spectrum Engineering and Shumaker had worked out a plan to incorporate measured quantities of lime kiln dust into the coal waste that provided thorough and even mixing at a reasonable production rate and at a reasonable cost. This system had the following elements:

a) Build a 250 foot long pad containing approximately 2000 loose cubic-yards of coal slack. The quantity of slack in the pad must be measured and coordinated with the number of loads of kiln dust that will be dumped and the specified liming rate;

b) Cut one shallow trench along the total length of the pad for each truck load of kiln dust. The trenches must be evenly spaced;

c) Weigh trucks as they arrive. Each truck holds roughly 40 tons of kiln dust;

d) Belly dump one load into each trench spreading it evenly along the entire length of the trench. Most trucks must be towed across the pad;

e) Use a covered paddle wheel scraper to simultaneously excavate the coal slack and kiln dust in the mixing pad;

f) During mixing, the pad is sprayed with water and disced;

g) Each scraper load of the coal slack and kiln dust mixture is dumped on a processed material stockpile and blended into subsequent loads;

h) As backfill space becomes available, the processed waste stockpile is excavated with a scraper further mixing the previously processed material from different loads and pads;

I) The scraper takes the material from the processed waste stockpile to a backfill area and spreads it in long thin layers again mixing the material and randomly blending material from various loads;

j) A grader and dozers spread and further mix the material as it is distributed and compacted in the backfill area.

For the 1997 work, Shumaker would be required to excavate an estimated 37,000 CY of coal waste from 4.28 acres and to neutralize it with lime kiln dust. ***The lime kiln dust had already been secured under a separate contract and was not need to be purchased by the Contractor.*** After the coal waste had been neutralized, it would be replaced in the areas from which it was excavated. The Contractor would replace the coal waste to create approximately the same landform. All edges must be graded to match the existing contours.

All of the material on the northeast side of the creek would need to be excavated and hauled to an area on the south side where it could be processed. The original plan was to put this processed material back on the NE side. After the NE side was completed, it was anticipated that the SW side of the creek would be excavated and processed.

The accurate mixing of the lime kiln dust with the coal waste was considered to be critical to the success of this project. Any randomly selected square yard of mixed material should be able to be tested and shown to be thoroughly mixed to the design neutralization criteria. A coal waste density with 18% moisture content of 1 ton per 1 per loose cubic-yard was assumed. Samples from the NE side indicated that 93 tons of lime per 1000 tons of waste would provide us with an adequate confidence level that even the most acid materials in this area would be sufficiently neutralized; while, the tonnage on the SW side of the creek would be neutralize at 169 tons of lime per 1000 tons of waste. It was anticipated that liming rates would need to be increased by 7% to account for wind losses bringing the rates to 100 and 180 tons of lime per 1000 tons of coal waste respectively.

Care would be taken by the Contractor during each phase of this process to insure that the amount of lime kiln dust lost to the environment was kept to a minimum. Dust control measures would include spray bars on the mixing equipment. The lime kiln dust hauled during the course of this project would be incorporated into the coal waste as the lime kiln dust was hauled to the site.

(8) **Neutralize Coversoil Stripped from Coal Waste Area with $CaCO_3$** - All coversoil salvaged from above the coal waste areas (5,500 cubic yards) would be neutralized with calcium carbonate ($CaCO_3$). This neutralization requires uniform lime mixing (incorporation) with equipment designed for such mixing throughout the entire depth of the coversoil. A liming rate of 24 tons of pure lime per 1000 cubic-yards of soil would be used. This equates to 19.4 tons/6-inch slice/acre. *Note that lime kiln dust could not be used for neutralization of the coversoil.*

(9) **Import Coversoil** - In order to get good material for top dressing, the Contractor would be required to borrow 5,500 cubic yards of coversoil from a borrow area located about 1 mile from the Lehigh site. Since the borrow area would not be located on the project site, the Contractor would be required to make all arrangements for acquiring the coversoil. The imported coversoil would be placed over the soil salvaged on-site.

(10) **Fertilize, Seed and Mulch** - All disturbed areas would be seeded, fertilized and mulched upon completion of the other work items. An estimated 12 acres would require revegetation. A drill seeding rate of 23 pounds of pure live seed per acre, a fertilizer rate of 92.5 pounds of nutrients per acre, and a straw or grass hay mulching rate of 3,000 pounds per acre would be used.

4.2 Major Equipment List

Type	Make/Model	Size/Horsepower	No. on Job
Bulldozer	Caterpillar D-8N	285 Hp	1
Bulldozer	Caterpillar D-9G	385 Hp	1
Scraper	Caterpillar 627B	14-20 yd/ 450 Hp	4
Scraper	Caterpillar 633C	32 yd/ 415 Hp	1
Hydraulic Excavator	Caterpillar EL300	2 yd/ 206 Hp	1
Wheel Loader	Caterpillar 966C	3.4 yd/ 170 Hp	1
Backhoe-Loader	Caterpillar 436	1.4 yd/ 77 Hp	1
Backhoe-Loader	Case 480E LL	0.9 yd/ 63 Hp	1
Motor Grader	Caterpillar 140G	150 Hp	1
Seed Drill	Brillion		1
Offset Disc	Rome		1
Crimper			1
Service Truck	Mack		1
Fuel Truck	Kenworth '65	8000 Gal	1
Water Truck	Peterbilt '67	4200 Gal	1
Tool Van			1
Scales			1
Generator Set	Overlite		1
Water Pump		6-Inch	1

4.3 Contractor Employees

During the first week of operation preceding kiln dust deliveries, Shumaker had 2 to 6 employees on site with the construction superintendent, Duane Shumaker. During the 17 days of lime kiln dust delivery, TranSystems typically had 10 truck drivers working and Shumaker had 9 employees and their construction superintendent at the Lehigh Site. TranSystems also had additional personnel at the loading site in Townsend. During the 7 work days when processed coal slack was being placed and contoured and coversoil was being imported, Shumaker had 7 employees working under the construction superintendent. Revegetation work items took about 6 days with from 3 to 7 personnel on site.

4.4 Construction Activities

Work on the 1997 Lehigh Phase II Project proceeded according to the general plan and work specifications. Notable changes in the plan quantities and in the planned work are discussed in section ***3.6 Change Orders***. The construction inspector's observations and comments on the daily work activities are present below:

March 19 The first day of construction. Duane Shumaker and two operators were on-site. Two 627 scraper was used to begin stripping and stockpiling coversoil.

March 20 Four people on site stripping topsoil from both the north and south sides of the creek and stockpiling. Topsoil is dry. Stripping with two 627B scrapers and a D8N dozer. Using backhoe to dig test holes to find edge of coal slack. Bottom is very wet and sloppy. Water pump and disc arrive on site.

March 21 Five people on site. Still stockpiling topsoil in the morning. Installed 300 feet of silt fence in creek bottom and by stockpiles. Second dozer arrives on site at 11:55 a.m. At 12:30 p.m., leveling pads and stockpiling coal from NE area.

March 24 Six people on site working through the snow and wind. Running two 627B scrapers and a D8N to haul slack from the NE area to pads for liming. Installed 1500 feet of silt fence around topsoil, stockpiles and coal slack. Stripping from the NE area all day.

March 25 Six people on site. Still stripping coal from NE area. Three 627B scrapers running. At 9:30 a.m., Joel Chavez arrived on site, said everything looks good. Contractor suggested treating and burying all of the processed slack on SW area. At 11:00 a.m., started running four 627B scrapers. Picked up slack all day in NE area. Installed another 1000 feet of silt fence.

March 26 Seven people on site. Water truck arrived on site at 7:30 a.m. Three 627B scrapers running all day to haul slack from the NE area. Scales arrive on site at 9:00 a.m. from TranSystems. Rockwell arrived on site at 2:30 to calibrate scales.

March 27 Nine people on site. Five truck loads of lime kiln dust arrive between 8:40 a.m. and 9:45 a.m. Coal and lime mixed and stockpiled by 11:00 a.m. The mixing procedure is to pull lime trucks through the "runway" mixing pad after trenching with the D8N. After the kiln dust and coal waste are mixed by the 633C paddle wheel scraper, the processed material is stockpiled. Spent the rest of the day hauling slack from the NE area and stockpiling. Three 627B scrapers and the D9 dozer worked on the slack.

March 28 Ten people on site. First lime truck arrives at 8:00 a.m. One crew stripping coal while another is doing the mixing. All six truck loads for the day unloaded on coal slack by 9:10 a.m. Limed coal, mixed, and stockpiled by 10:30. Rest of day spend hauling slack from NE area. Stockpiling with three 627B scrapers and one D9 push dozer. Mixing lime with a D8N and the 633 scraper. Covering lime with a 140G motor grader.

March 29 Ten people on site. First of six lime trucks arrived on site at 8:00 a.m. Trucks dumped, mixed and stockpiled by 10:15. Still cleaning up slack from NE area, off site at 12:30. Stockpiling slack with three 627 scrapers and one D9 push dozer, mixing lime with the D8N and paddle-wheel scraper and the motor grader.

March 31 Ten people on site. Seven loads of lime kiln dust dumped, mixed and stockpiled by 12:00. Repaired soft spots in county road. Started snowing at 12:30, heavy snow and blowing all afternoon but still clearing NE area. Same equipment spreads working.

April 1 Ten people on site. Lime trucks cannot deliver due to icy conditions out of Great Falls. Work 3 hours on NE area hauling coal slack. Blizzard conditions make it impossible to work any longer. Visibility is zero. Road bladed with 140 grader.

April 2 Ten people on site. Still hauling coal slack from NE area. First lime truck arrives at 9:25. Ten trucks dumped by 11:30 a.m. Mixed and stockpiled at 3:30. Coal slack excavation in NE area completed. Stripped 520 CY of soil off SW area. Stockpiling with four 627 scrapers and one D9G dozer, pulling lime trucks with D8N, and mixing lime with 633 scraper.

April 3 Ten people on site. First lime truck arrives at 7:55. Start stripping coal from SW area and stockpiling after another 720 CY of soil is stockpiled. Last of 11 trucks dumped by 9:30. Mixed and stockpiled by 3:15. Rest of day spent stockpiling coal from SW area.

April 7 Both dozers spent 5½ hours pulling lime delivery trucks. Three scrapers excavating coal slack. The paddle-wheel scraper continues to mix and pile processed coal. 59.95 tons of lime arrives from Warren and is mixed with stockpiled soil.

April 8 Three people on site. Running on skeleton crew, waiting on trucks from Warren to treat NE area. Lime trucks did not deliver today because of road conditions. Snow is melting; and it's becoming pretty sloppy. Trucks with 56.63 tons of lime arrive from Warren at 4:00 p.m.

April 9 Ten people on site. Lime kiln dust trucks arrive at 7:30. Graded road and pulled trucks up hill with D9 and wheel loader. Scrapers are hauling coal slack from SW area. All 10 trucks dumped by 11:00 a.m. Mixed and stockpiled at 1:30. Heavy snow and fog all day. Stripping coal slack all afternoon and stockpiling. Two trucks with 57.23 tons of lime arrive from Warren. Lime mixed with stockpiled soil by 5:15.

April 10 Ten people on site. Snowing all day long. First lime kiln dust truck arrives on site at 8:30. Chutes on trucks keep freezing closed; so, must hook chain on and pull open. Last of ten trucks towed to scales at 11:10 a.m. Lime and coal mixed and stockpiled by 2:00 p.m. All day spent stripping coal from SW area and stockpiling. Had three 627 scrapers, one 633 paddle-wheel scraper, two bulldozers and the 140G motor grader working.

April 11 Ten people on site. First lime kiln dust truck arrives on site at 7:50. Road is frozen but still need to tow trucks up the hill. Still hauling slack from SW area. Eleven trucks dumped by 11:00 a.m. The kiln dust is mixed into slack and the processed material is stockpiled by 3:00 p.m. Started to excavate creek bottom.

April 14 Ten people on site. First of 11 trucks arrive on site at 7:00 a.m. Trucks dumped at 9:30 a.m.. Slack processed with delivered kiln dust and stockpiled at 2:00 p.m. Still hauling slack from SW area. Finished excavating SW area and building pads by 4:15 p.m. Off site at 4:45.

April 15 Ten people on site. The sun is finally out. First lime truck arrives at 7:50 a.m. Scrapers are starting to spread topsoil on NE area. Scrapers also working on stockpile of processed slack and spreading it on SW area. Last of 11 trucks dumped at 9:45 a.m. Mixed and stockpiled at 1:15. Rest of day spend spreading processed slack on SW area. Off site at 4:45.

April 16 Ten people on site. First kiln dust truck arrives on site at 7:45. Spreading limed coal from stockpile over SW area. Starting to water process area to suppress dust. Last of 10 trucks dumped at 9:15 a.m. Scrapers spreading limed soil on NE area. Done stockpiling coal-lime mix at 1:30. NE area is covered with limed soil and ready for top dressing with imported soil at 4:45.

April 17 Ten people on site. First lime kiln dust truck on site at 7:40. Last of ten trucks dumped at 9:15. Topsoil stockpile from NE area replaced as a subsoil. Now starting to stockpile imported soil which is being hauled by the 627 scrapers. Watering kiln dust and coal to keep from blowing away. Mixed coal stockpiled at 2:30 p.m. Off site at 4:45.

April 18 Ten people on site. First lime truck arrived at 7:45. Two scrapers importing topsoil for NE area. Topsoil stockpiled on NE area at 12:00. At 9:15, last of 10 trucks dumped. Slack mixed and stockpiled at 2:30 p.m. Spraying water to control dust. Scrapers spent afternoon hauling stockpiled coal onto runway.

April 19 Ten trucks delivered 397.94 tons of lime kiln dust. D8N pulled truck over runway for about 2 hours. One 633 scraper and one 627 scraper mixing slack and kiln dust. The 140G grader used to cover and spread kiln dust. Worked half a day with small crew.

April 21 Seven people on site. Watering stockpile and liming runway. Wind is blowing hard and fighting to keep dust down with water. Last of eight trucks dumped at 10:00. Coal mixed and starting to lay in place on SW area. Just had the paddle-wheel scraper, one dozer, the motor grader and water truck operating. Lime kiln dust delivery is completed.

April 22 Eight people on site. Spreading mixed coal over SW area. TranSystems arrived on site at 8:20 a.m. to remove scale. Watering to suppress lime dust. Spent all day spreading coal with three scrapers, a D8N dozer and the 140G grader.

April 23 Eight people on site. Still spreading processed coal over SW area with four scrapers, a D8N dozer and the 140G grader. Watering mix to help retain lime kiln dust in mix, blowing hard. Joel Chavez arrived on site. Two trucks from Warren delivered 63.15 tons of lime for soil neutralization. Off site at 4:45.

April 24 Eight people on site. Moving processed coal slack around and contouring. All stockpiled processed material is contoured in place and ready for top-dressing at 2:30 p.m. Two more trucks with 62.92 tons of lime from Warren arrive at 3:40 p.m. Dumped for mixing and off site at 4:45 p.m.

April 25 Rained and snowed out.

April 28 Eight people on site. Last two trucks from Warren dumped. Scrapers laying in limed soil over processed coal on SW area. Grading and contouring all day. Importing topsoil at 2:00 p.m. In all six 627 scrapers and one D8N working on site.

April 29 Eight people on site running four scrapers and two dozers. Hauling borrow soil and contouring. Straw for mulching arrives on site at 8:45. Imported topsoil spread over both areas.

April 30 Eight people on site running four scrapers, two dozers, and a motor grader. Hauling topsoil and discing areas. Second load of straw arrives at 9:15 a.m. Starting to move some machinery off site (water pump, water truck, backhoe).. All topsoil is hauled and on site.

May 1 Eight people on site running one scraper, two dozers, and a disc. Snowing and windy but still working on contouring area. Cleaning two scrapers to move off site. Scrapers take off at 8:45. Day spent discing and preparing site for fertilizing and seeding.

May 2 Snowed canceling work.

May 5 Three people on site running a Case 480 backhoe/loader, one dozer, and a motor grader. Enough crew working now to clean up area and put final touches on area before fertilizing and seeding.

May 6 Three people on site. Discing and seeding all day. MDEQ final inspection. Straw bales installed in creek bottom. Fertilizer truck arrives at 4:45. Area fertilized and off site at 6:30.

May 7 Four people on site. All areas fertilized. Borrow area, haul road and NE area fertilized and seeded. Now seeding SW area. At 10:30 a.m. mulch spreader arrives on site to begin spreading on NE area. At 11:00 a.m. rest of straw arrives on site. Spreading straw and crimping NE area.

May 8 Five people on site. Crimping NE area. Spreading straw on SW area. Fertilized and seeded pond area. Fertilized, seeded, and mulched old road cutout. Manure spreader broke down so spreading straw on SW area by hand. NE area complete.

May 9 Seven people on site. Spreading straw and crimping. NE area complete, working on SW area and road cut. Spread straw and crimped all day. Some places crimp well, some don't. Wind blowing straw. Done crimping and off site at 4:45.

4.5 Quantities Used

All work items except mobilization were bid or negotiated on a unit price basis. An on-site construction inspector measured items for payment and recorded load counts. Bid quantities were adjusted based on field measurements. Some unit prices changed during construction to account for changes in work requirements.

Item	Amount	Unit Cost
EROSION CONTROL PROTECTION (STRAW BALE DIKE OR SILT FENCE)	2,800 Ft	$6.00 per foot
PROVIDE WATER	1300 KGal	$30.00 per KGal
REMOVE, STOCKPILE & REPLACE COVERSOIL	14,500 CY	$1.75 per cubic-yard
DELIVER LIME KILN DUST FROM CONTINENTAL LIME TO PROJECT SITE	6,473.24 Tons	$25.00 per ton
EXCAVATE//NEUTRALIZE WITH 260 LB $CaCO_3$ PER CY/REPLACE WASTE	49,858 LCY or Ton	$2.50 per LCY or Ton
NEUTRALIZE COVER SOIL STRIPPED FROM COAL WASTE AREA WITH $CaCO_3$ AT 60 TONS/ACRE	5.73 Acres	$3,200.00 per acre
REMOVE AND PLACE NATIVE COVERSOIL	14,500 CY	$1.75 per cubic-yard
IMPORT AND PLACE COVERSOIL	7,868 CY	$5.50 per cubic-yard
FERTILIZE, SEED, AND MULCH	17.7 Ac	$1,200.00 per acre
HAUL COAL WASTE	31,122 Tons	$0.29 per ton

5. PAYMENT REQUESTS

5.1 Pay Request

Two pay requests were processed during 1996 and one pay request was processed during the 1997 construction period. A copy of the 1997 request has been included in ATTACHMENT 3.

5.2 Cost per Site

PROJECT SITE	ACREAGE UNDERLAIN BY COAL	TOTAL CONST. COST	COST PER ACRE
LEHIGH PHASE 1 - 1995	3.49 Acres	$934,106.26	$267,652.22
LEHIGH PHASE 2 - 1996	6.21 Acres	$1,027,722.75	$165,494.81
LEHIGH PHASE 2 - 1997	4.28 Acres	$534,955.15	$124,989.52

5.3 Total Project Cost

The total 1977 construction and engineering cost for the 1997 Lehigh Phase II project which addressed approximately 27-percent of the total site remediation amounted to $557,611.37. Total engineering costs were 4.24-percent of the construction cost. An analysis of the engineering costs versus construction costs is presented in ATTACHMENT 4.

During the 1997 construction period, the MDEQ purchased 6473.24 tons of lime kiln dust directly from Continental Lime for a price of $6.00 per ton at their plant in Townsend. This yields a material cost of $38,839.44. Shumaker Trucking and Excavating Contractors, Inc. was paid $496,115.71 for delivering the kiln dust, mixing it into the coal waste, and performing reclamation work. Consequently, the total construction cost for Lehigh Phase II - 1997 was $534,955.15.

The engineering design cost for the 1997 Lehigh Phase II project was only $414.68 because design was limited to the work necessary to revise an existing construction contract to cover an adjacent work area. This is about 0.08-percent of the construction cost. Construction inspection and project management for the construction phase cost $18,953.16 which includes $720.00 in laboratory costs. Preparation of a final report cost $3,288.38. Therefore, the total cost for construction management and inspection in 1997 was $22,241.54 or about 4.16-percent of the construction cost. Total engineering and construction management costs for the 1997 project were $22,656.22.

6. PROJECT SUMMARY

6.1 Summary of Project

Spectrum Engineering was assigned the task of construction management for the 1997 Lehigh Phase II Project which was designed to treat acidic coal wastes at the eastern end of the Lehigh

Site. This was the final phase of a three year project. For the final phase, existing engineering and construction contracts from the previous year's work were extended to complete the remainder of the Lehigh site work. As in the previous years, Continental Lime's Indian Creek Plant at Townsend supplied lime kiln dust directly to MDEQ at a unit price of $6.00 per Ton FOB at the plant.

The 1997 Lehigh Phase II project was completed by Shumaker Trucking and Excavating in 1997. They worked during 1996 and 1997 on the project. During 1996, Shumaker processed 86,832 tons of coal waste with lime kiln dust at an average neutralization rate of 180 tons of lime (100% calcium carbonate equivalence) per 1000 tons of coal waste or 182 tons of lime kiln dust per 1000 tons of coal waste. During 1997, Shumaker processed 49,858 tons of coal waste with lime kiln dust at an average neutralization rate of 131 tons of lime (100% calcium carbonate equivalence) per 1000 tons of coal waste or 129 tons of lime kiln dust per 1000 tons of coal waste. The neutralization rate for the final phase was based on Dr. Doug Dollhopf sampling and analysis of the specific area using a theoretical 50% confidence level for having all possible samples completely neutralized.

Even though the liming rate was reduced significantly for Phase II, all of the samples taken during 1997 construction show that the area was still over-neutralized by a minimum of 28 tons per 1000 tons of coal slack. Weekly composite samples taken during construction show the following:

PERIOD	EXCESS LIME ADDED TO PROCESSED MATERIAL
Week of 3/31-4/3/97	28 Tons per 1000 Tons of slack
Week of 4/07-11/97	62 Tons per 1000 Tons of slack
Week of 4/14-18/97	57 Tons per 1000 Tons of slack

In 1997, the treated area covered 4.28 acres of coal waste. The supply and construction cost for the work completed during 1997 Phase II was $534,955.15. An additional $22,656.22 in inspection and engineering costs are associated with the 1997 work. That brings the total construction cost for all three years of work at the main Lehigh site to $2,496,784; the engineering and construction management to $157,978.36; and the total cost to $2,654,762.52.

6.2 Site Condition after Completion

All 14 acres of coal slack at the Lehigh Site have been neutralized. All coal slack has been replaced on the south side of the creek. The creek is at least 15 feet from the edge of the processed material that has been replaced. All areas which were disturbed by construction have been recontoured and covered with a combination of imported coversoil and neutralized coversoil. The coversoil was seeded, fertilized, and mulched. Portions of the creek bottom were excavated to remove coal waste and silt. These areas were also regraded and covered with imported coversoil. Otherwise the drainage will be left to reestablish itself. Vegetation on the Phase I (1995) and 1996 Phase II areas had not been reestablished by the Spring of 1997. Vegetation over the entire project area must be monitored.

The Montana Department of Fish, Wildlife and Parks was planning to plant a large number of juniper and other trees on the site. The tree planting will be done under an agreement between the landowner and the FW&P. Consequently, tree planting is completely independent of this project.

6.3 Maintenance or Follow-up

The revegetation progress should be monitored. This should include weed control. It would also be beneficial to periodically sample the processed material which has been replaced in the project area in order to monitor the effectiveness of the project over time.

In 1997, Spectrum dug one test pit in the processed waste which has been replaced during Phase I and one test pit in the neutralized material that was replaced in 1996. One composite sample of the total vertical depth of the pit was collected for each pit. The 1995 sample had a pH of 10.1 and an excess lime neutralization potential of 128 Tons/1000 Tons. In 1995, we reported that the average overliming rate had been 173 Tons/1000 Tons. The 1996 sample had a pH of 11.8 and an excess lime neutralization potential of 137 Tons/1000 Tons. In 1996, we reported that the average pH had been around 12 and that the average overliming rate had been 89 Tons/1000 Tons.

6.4 Construction Bid Package

Copies of the site plan drawings which were provided in the 1996 bid package can be found in the Lehigh Phase II Final Report dated December 18th, 1996.

6.5 As-Built Drawings

As-built drawings are located in ATTACHMENT 6.

7. COMMENTS/SUGGESTIONS

Due to the problems and costs that were experienced during the first phase of the Lehigh project, the process of neutralizing the coal slack was reconsidered for the Phase II Project. Direct application of the kiln dust and the paddle-wheel mixing method that was used during Phase II was simple in concept. Because the mixing could be accomplished rapidly and easily, the work was completed in a much shorter time period than had been previously experienced and without the apparent lime losses. In 1997, we used a 50% confidence level combined with a 7% wind loss factor which over neutralized the average ton of coal by about 30 percent. Weekly composite samples show that the pH of the processed material fluctuated between 8.5 and 10.1. The neutralization rates used in 1997 were the lowest used during the entire project.

As reported in Section 6.3, the pH of the material processed in 1995 could still be as high as 10.1 (based on one sample); and the pH of the material processed in 1996 could still be as high as 11.8 (based on one sample). Because a pH spike that rapidly decreased was anticipated, additional monitoring is suggested.

8. PHOTOGRAPHS/SLIDES

8.1 Listing

A description of the photographs taken to document the work performed is found at the back of the final report under ATTACHMENT 8. The numbers on each picture correspond to the listing which precedes the photographs. The pictures are organized according to the following topics:

PICTURES	TOPIC
1-20	Contractor's Equipment
21-25	Salvage Coversoil
26-28	Hauling Kiln Dust
29-44	Excavating Coal Slack
45-61	Neutralize Coal Waste
62-81	Coversoil
82-89	Revegetation
90-93	Post-construction

ATTACHMENT 1

BID TABULATION

1997 LEHIGH PHASE II COST ESTIMATE

ITEM NO.	DESCRIPTION	UNITS	1996 PHASE II CONTRACT QUANTITY + CO AMTS	1996 PHASE II UNIT PRICE	1996 PHASE II TOTAL PRICE	1997 PHASE II CONTRACT QUANTITY	1997 PHASE II UNIT $	1997 PHASE II TOTAL
1	MPDES Permit		1	$650.00	$650.00	1	$650.00	$650.00
2	Mobilization (Shumaker)		1	$138,000.00	$138,000.00	1	$55,000.00	$55,000.00
	Mobilization (TranSystems)		0	$0.00	$0.00	1	$7,620.00	$7,620.00
3	Erosion Control Silt Fence	Feet	1650	$6.00	$9,900.00	500	$6.00	$3,000.00
4	Provide Water	Kgal	1709.4	$31.52	$53,880.29	350	$30.00	$10,500.00
	(1st 130 @$50 then $30 in 96)							
5	Remove & replace topsoil	CY	5560	$1.75	$9,730.00	5500	$1.75	$9,625.00
6	Deliver lime kiln dust	Tons	15846.35	$22.00	$348,619.70			
	Trucking increase due to 1					4810	$25.00	$120,250.00
	shift in 1997 vs 2 shifts in 1996							
7	Excavate, neutralize, replace	Tons	15846.35	$17.00	$269,387.95			
	Longer time to mix & incorporate					4810	$19.27	$92,688.70
	due to lower lime application rate							
8	Neutralize coversoil	Acres	6.92	$3,200.00	$22,144.00	4.5	$3,200.00	$14,400.00
9	Coversoil borrow	CY	2900	$3.00	$8,700.00	0	$3.00	$0.00
	Import coversoil	CY	7510	$5.50	$41,305.00	5500	$5.50	$30,250.00
10	Fertilize, seed & mulch	Acres	22	$1,200.00	$26,400.00	12	$1,200.00	$14,400.00
Extra	Pull in lime trucks due to spring							
	weather conditions (15 days)	Hours				90	$125.00	$11,250.00
Extra	Transport NE area coal slack to							
	SW area, mix and return	Tons		No. of Moves =	2	22850	$0.29	$13,253.00
TOTAL ESTIMATED COST FOR 1997								$382,886.70

COSTING ASSUMPTIONS

NE Area: 2.73 acres, 22,850 tons of coal slack

Liming rate of 93 tons plus 7% wind loss or 100 tons/1000 tons

Tons of lime required: 100/1000 x 22,850 = 2,280 tons

SW Area: 1.55 acres, 14,000 tons of coal slack

Liming rate of 169 tons plus 7% wind loss or 180 tons/1000 tons

Tons of lime required: 180/1000 x 14,000 = 2,530 tons

Coversoil: No on-site borrow allowed by landowner, import 9 inches to cover 4.5 acres = 5,500 cubic yards

TRANSYSTEMS INC.

PROJECT QUOTATION

Lehigh Phase II 1996

TO: GENE SHUMAKER

SHUMAKER TRUCKING & EXCAVTING
PH. 406 727-3537
FAX 406 727-9995

Quotation date: 7/10/96 11:24

Project name and number: COAL MINE REMEDIATION

Project owner: MONTANA DEPARTMENT OF LANDS

Description of work to be performed by Transystems: LOAD, HAUL, SCALE AND DUMP LIME DUST FROM CONTINENTAL LIME TO SITE SOUTHWEST OF WINDHAM. UNLOAD TO BE WINDROW.

BID ONLY GOOD IF HAUL STARTS BY AUG. 15 AND IS COMPLETE BY SEPT. 3. TSI TO WORK 2 SHIFTS 7 DAYS.

Anticipated start date: 15-Aug End date: 3-Sep

	#1	#2	#3	#4	#5	#6
Product	LIME	0	0	0	0	0
Origin	CONTL LIME	0	0	0	0	0
Destination	WINDHAM	0	0	0	0	0
Tons	16,000	0	0	0	0	0
Haul days	18	0	0	0	0	0
Shifts/day	2	0	0	0	0	0
Hours/shift	9.00	.00	.00	.00	.00	.00
Route						
One-way miles	201.5	0	0	0	0	0
Tons per hour	48	0	0	0	0	0
Davis Bacon	no	no	no	no	no	no
Rate per TON	18.67	.00	.00	.00	.00	.00

Loading Responsibility	TSI	Loading Method	FRONTEND LOADER
Unloading Responsibility	TSI	Unloading Method	WINDROW
Weighing Responsibility	TSI	Weighing Method	PLATFORM SCALE

Retention allowed	Yes ☐	No ☒	Bond included	Yes ☐	No ☒
Sales tax included	Yes ☐	No ☒	TSI's prepared cert.	Yes ☐	No ☒
Mobilization charges included	Yes ☒	No ☐	One time	Yes ☐	No ☒

Terms: net 10 days

Quotation is subject to acceptable subcontract.

Quotation expires 15 calendar days from date above.

Quotation subject to TSI's schedule of equipment availability as of the quotation date.

Quotation supersedes prior quotations.

<quotation.fm> Rev. June 25, 1993 TSI FILE MDOL6-1

511 Central Ave. West, Suite 2 / Great Falls / Mt 59404 / (406) 727-7500 / Facsimile (406) 454-1085

ATTACHMENT 2

CHANGE ORDERS

MAR 0 4 1997

Department of
Environmental Quality
Remediation Division

CHANGE ORDER

ORDER NO. 3

PROJECT TITLE: 1997 Lehigh Phase II Project

MT DEQ-MWCB: 94-002

CONTRACT DATE:

OWNER: Department of Environmental Quality, Mine Waste Cleanup Bureau

CONTRACTOR: Shumaker Trucking and Excavating

Change Orders must be accompanied by an itemized cost breakdown. You are hereby requested to comply with the following changes from the Contract Documents. (Show separate costs for materials, labor, equipment, and miscellaneous. Show percent where applicable.)

ITEM NO.	DESCRIPTION OF CHANGES - ESTIMATED QUANTITIES & UNITS	COST OF CHANGES					TOTAL COST
		MAT'LS	LABOR	EQUIP.	MISC.	TOTAL UNIT COST	
1	MPDES permit renewal					650.00	650.00
2	Remobilize to site (Shumaker at $55,000 and TranSystems at $7,620 per their attached bid sheet)					62,620.00	62,620.00
9	Erosion silt fence (500 LF x $6/LF)					3,000.00	3,000.00
4	Provide water (350 Kgal x $30/Kgal)					10,500.00	10,500.00
5	Remove/replace topsoil (5500 CY x $1.75/CY).					9,625.00	9,625.00
6	Deliver kiln dust (4810 tons x $25/ton)					120,250.00	120,250.00
7	Excavate & mix coal/kiln dust (4810 tons x $19.27/ton)					92,688.70	92,688.70
8	Neutralize coversoil (4.5 ac x $3200/ac)					14,400.00	14,400.00
9	Import coversoil (5500 CY x $5.5/CY)					30,250.00	30,250.00
10	Fertilize/seed/mulch (12 ac x $1200/ac)					14,400.00	14,400.00
N/A	Pull in lime truck (90 hrs x $125/hr)					11,250.00	11,250.00
N/A	Transport coal to mixing area (2 moves x 22,850 tons x $0.29/ton/move)					13,253.00	13,253.00

Original Contract Price	$ 841,400.00
Current Contract Price Adjusted by Previous Change Order	$ 932,644.65
Cost this Change Order (+ or -)	+ $ 382,886.70
New Contract Price including this Change Order	$1,315,531.35

The completion date as set forth in the Contract Documents shall be (unchanged, increased, decreased) by 75 calendar days.

Description of Change:

The 1996 Lehigh Phase II project was placed into winter/material shut down on October 3rd, 1996. This was necessary due to the lack of lime kiln dust and the loss of the lime trucking firm due to a previous commitment. The 1997 Lehigh Phase II project will address the final 1/3 of the project area. The project will start at the ending point of the 1996 Phase II Project and complete the southwest side of the draw and then move to the northeast side of the draw.

The quantities and estimated costs for completion of the 1997 phase have been detailed on the attached sheet. Shumaker Trucking anticipates starting on March 10th and being completed by the end of April 1997. The contract time is set at 75 days to allow for some anticipated weather shut-downs due to spring rains and/or snow storms.

SURETY CONSENT

The Surety hereby consents to the aforementioned Contract Change Order and agrees that its bond or bonds shall apply and extend to the Contract as thereby modified or amended per this Change Order. The Principal and the Surety further agree that on or after execution of this consent, the penalty of the applicable Performance Bonds or Bonds is hereby increased by $ 382,886.70 (100% of the Change Order amount) and the penalty of the applicable Labor and Material Bond or Bonds is hereby increased by $ 382,886.70 (100% of the Change Order amount).

COUNTERSIGNED BY MONTANA RESIDENT AGENT

Gordon D McManus bc

GORDON D. MCMANUS
FLYNN INSURANCE AGENCY
BOX 711, GREAT FALLS, MT 59403

SURETY

FIDELITY AND DEPOSIT COMPANY OF MARYLAND

By: John D Leaf

JOHN D. LEAF Seal ATTORNEY-IN-FACT

Recommended by: Shumaker Trucking and Excavating Contractor — Date 3-3-97

Accepted by: Spectrum Engineering Engineer — Date 2/28/97

Approved by: Owner — Date 3-3-97

oh 3/5/97

CHANGE ORDER

ORDER NO. 4 - Final

PROJECT TITLE: 1997 Lehigh Phase II Project

DEQ NO.: 94-002

CONTRACT DATE:

OWNER: Department of Environmental Quality

CONTRACTOR: Shumaker Trucking and Excavating

Change Orders must be accompanied by an itemized cost breakdown. You are hereby requested to comply with the following changes from the Contract Documents. (Show separate costs for materials, labor, equipment, and miscellaneous. Show percent where applicable.)

ITEM NO.	DESCRIPTION OF CHANGES - ESTIMATED QUANTITIES & UNITS	COST OF CHANGES					TOTAL COST
		MAT'LS	LABOR	EQUIP.	MISC.	TOTAL UNIT COST	
4	No MPDES permit required					(650.00)	(650.00)
3	Erosion silt fence (2300 LF x $6/LF)					13,800.00	13,800.00
4	Provide water (-50 Kgal x $30/Kgal)					(1,500.00)	(1,500.00)
5	Remove/replace topsoil (9000 CY x $1.75/CY).					15,750.00	15,750.00
6	Deliver kiln dust (1663.24 tons x $25/ton)					41,581.00	41,581.00
7	Excavate & mix coal/kiln dust (1663.24 tons x $19.27/ton)					32,050.63	32,050.63
9	Neutralize coversoil (1.23 ac x $3200/ac)					3,936.00	3,936.00
9	Import coversoil (2368 CY x $5.5/CY)					13,024.00	13,024.00
10	Fertilize/seed/mulch (5.7 ac x $1200/ac)					6,840.00	6,840.00
N/A	Pull in lime truck (-59 hrs x $125/hr)					(7,375.00)	(7,375.00)
N/A	Transport coal to mixing area (-1 move x 22,850 tons x $0.29/ton/move + 8,272 extra tons x $0.29/ton)					(4,227.62)	(4,227.62)

Original Contract Price	$ 841,400.00
Current Contract Price Adjusted by Previous Change Order	$1,315,531.35
Cost this Change Order (+ or -)	+ $ 113,229.01
New Contract Price including this Change Order	$1,428,760.36

ok [signature] 5/15/97

The completion date as set forth in the Contract Documents shall be (unchanged, increased, decreased) by 0 calendar days.

Description of Change:

This change order is necessary to adjust the final quantities to actual amounts used or consumed through project completion.

Item 1: The MPDES permit was not required and this bid Item was deleted ($-650.00).

Item 3: After evaluating the proposed disturbance line in the field, it was felt that the entire eastern (downhill) edge needed silt fence. This increased the planned footage from 500 feet to 2800 feet (+2300 feet x $6.00/foot = $13,800)

Item 4: The water required went down from 350 Kgal to 300 Kgal (-50 Kgal x $30/Kgal = -$1,500)

Item 5: The coversoil was thicker than anticipated. The quantity increased from 5500 CY to 14,500 CY (+9,000 CY x $1.75/CY = $15,750)

Item 6: The quantity of coal slack increased from 22,850 tons to 31,122 tons on the NE side and from 14,000 tons to 18,735.6 tons on the SW side. This required the lime kiln dust quantity hauled to increase from 4,810 tons to 6485 tons (actually hauled 6473.24 or +1,663.24 tons x $25/ton = $41,581)

Item 7: The quantity of coal slack increased (see item 6). Actual tonnage needed and hauled was 6473.24 (+1,663.24 tons x $19.27/ton = $32,050.63)

Item 8: Neutralize coversoil acreage increased from 4.5 acres to 5.73 acres (+1.23 acres x $3,200/acre = $3,936)

Item 9: Import coversoil increased to account for the increased acreage to cover. This went from 5500 CY to 7868 CY (+2,368 CY x $5.50/CY = $13,024)

Item 10: The acreage fertilized, seeded and mulched increased from 12 acres to 17.7 acres (+5.7 acres x $1,200/acre = $6,840)

Extra: Pulling in the lime trucks was estimated to take 90 hours and it actually took 31 hours (-59 hours x $125/hour = $-7,375)

Extra: Transporting coal from NE side to SW mixing area and transport back was estimated at 22,850 tons x 2 moves x $0.29/ton/move. The project design changed and it was decided to leave all coal on the SW side of the drainage bottom. This eliminated one move. The quantity of coal increased, however, from 22,850 tons to 31,122 tons. The net contract difference from Change Order 3 is $-4,227.62 (decrease = 1 move x 22,850 tons x $0.29/move or $-6,626.50; increase = 8,272 more tons x 1 move x $0.29/ton/move or $2,398.88)

SURETY CONSENT

The Surety hereby consents to the aforementioned Contract Change Order and agrees that its bond or bonds shall apply and extend to the Contract as thereby modified or amended per this Change Order. The Principal and the Surety further agree that on or after execution of this consent, the penalty of the applicable Performance Bonds or Bonds is hereby increased by $ 113,229.01 (100% of the Change Order amount) and the penalty of the applicable Labor and Material Bond or Bonds is hereby increased by $ 113,229.01 (100% of the Change Order amount).

COUNTERSIGNED BY MONTANA RESIDENT AGENT

GORDON D. MCMANUS

FLYNN INSURANCE AGENCY

SURETY

FIDELITY AND DEPOSIT COMPANY OF MARYLAND

By: John D. Leaf

Seal JOHN D. LEAF ATTORNEY-IN-FACT

Recommended by: Shumaker Trucking and Excavating — Contractor — 5-12-97 Date

Accepted by: Spectrum Engineering — William C Nuell — Engineer — 5/9/97 Date

Approved by: Don R Anderson — Owner — 5/16/97 Date

ATTACHMENT 3

PAYMENT REQUESTS

PAYMENT REQUEST NO. 3 - Final

FROM 10/04/1996 TO 5/10/1997

PROJECT TITLE: 1997 LEHIGH PHASE II PROJECT

LOCATION: JUDITH BASIN COUNTY DEQ NO.: 94-002

NAME OF CONTRACTOR: SHUMAKER TRUCKING AND EXCAVATING

ADDRESS: P.O. BOX 1442, GREAT FALLS, MONTANA 59403

SUMMARY OF PROJECT STATUS

Amount of Original Contract		$ 841,400.00
Change Order No. 1	$ 32,766.00	
Change Order No. 2	$ 58,478.65	
Change Order No. 3	$ 382,886.70	
Change Order No. 4	$ 113,229.01	
Amount of Approved Change Order(s)		$ 587,360.36
TOTAL CONTRACT AMOUNT		$ 1,428,760.36

Pay Request No.	Amount of Request
1	$544,281.78
2	379,036.42
3	505,442.16

Total Contract Amount Completed to Date	$ 1,428,760.36
Less Retainage (0 %)	$ 0.00
TOTAL AMOUNT EARNED TO DATE	$ 1,428,760.36
Less Previous Payments	$ 923,318.20
AMOUNT DUE THIS PAYMENT	$ 505,442.16
Less 1% Tax	$ 5,054.42
TOTAL DUE CONTRACTOR	$ 500,387.74

ok 5/15/97

I certify that this claim is correct and just in all respects and that payment or credit has not been received.

SHUMAKER TRUCKING AND EXCAVATING
Contractor

By Eugene Shumaker

Date 5-12-97

APPROVED BY:

DEPARTMENT OF ENVIRONMENTAL QUALITY
Owner

By Vic R Anderson

Date 5-16-97

RECOMMENDED BY:

SPECTRUM ENGINEERING INC.
Engineer

By William C MacDo

Date 5/9/97

Item No.	Description	Contract Quantity	Contract Unit Price	Previous Quantity Requested	Current Quantity Completed	Total Quantity Completed to Date	Total Contract Amount Completed to Date	Amount Due this Payment
1-10	1996 Lehigh Phase II					0.00	0.00	0.00
1.	MPDES Permit	1 Each	650.00	1	0	1.00	650.00	0.00
2.	Mobilization	1 LS	138,000.00	0.61	0.39	1.00	138,000.00	0.00
3.	Erosion Control Silt Fence	1650 Foot	6.00	1000	300	1300.00	7,800.00	0.00
4.	Provide Water	130 Kgal	50.00	130	0	130.00	6,500.00	0.00
CO #1	Change Order 1 - Provide Extra Water - see change orders #1 & #2	0 Kgal	30.00 neg.	1092.2	487.2	1579.40	47,382.00	0.00
5.	Remove, Stockpile & Replace Coversoil	10,200 Cu Yds	1.75	5560 (@ $1)	5560 @ $0.75	5560.00	9,730.00	0.00
6.	Deliver Lime Kiln Dust to the Site	16,000 Tons	22.00	12029.27	3817.08	15846.35	348,619.70	0.00
7.	Incorporate Lime Kiln Dust with Coal Slack	16,000 Tons	17.00	12029.27	3817.08	15846.35	269,387.95	0.00
8.	Neutralize Coversoil	7.1 AC	3,200.00	0	6.92	6.92	22,144.00	0.00
9.	Coversoil Borrow	2,900 CY	3.00	0	2900	2900	8,700.00	0.00
10.	Fertilize, Seed & Mulch	10.9 AC	1,200.00	0	22.0	22.0	26,400.00	0.00
CO #2	Change Order 2 - clean-out ditch & behind Phase I silt fence	0	T & M	0	1	1	6,026.00	0.00
CO #2	Change Order 2 - import coversoil	0	$5.50 neg.	0	7510	7510	41,305.00	0.00
CO #3	Change Order 3 (CO #3) - 1997 Lehigh Phase II for all tasks	See Attached CO #3		0	1	1	382,886.70	382,886.70
CO #4	Change Order 4 (CO #4) - 1997 Lehigh Phase II for all tasks	See Attached CO #4		0	1	1	113,229.01	113,229.01
	Materials on Site (Attach Schedule)	--	--	$	$	--0.00	$0.00	$0.00
TOTALS							1,428,760.36	496,115.71

FOOTNOTE: All of the quantities are shown on the backup sheets attached.

1997 LEHIGH PHASE II

WORK QUANTITIES BY BID ITEM

DATE	BID ITEM 3	BID ITEM 4	BID ITEM 5	BID ITEM 6	BID ITEM 7	BID ITEM 8	BID ITEM 9	BID ITEM 10	PULL TRUCKS (HRS)	MOVE NE TONS TO SW
3/19/97			4420							
3/20/97			4680							
3/21/97	300		4140							
3/24/97	1500				2386.8					2386.8
3/25/97	1000				4648.8					4648.8
3/26/97					4804.8					4804.8
3/27/97				204.58	3822.0					3822.0
3/28/97				241.76	4102.8					4102.8
3/29/97				249.04	2074.8					2074.8
3/31/97				289.94	4430.4					4430.4
4/1/97					1294.8					1294.8
4/2/97			520	418.35	3556.8					3556.8
4/3/97			740	469.34	3182.4					
4/7/97				421.43	2605.2	59.92			11	
4/8/97						56.63			3	
4/9/97				419.28	3962.4	57.23			6	
4/10/97				422.44	3026.4				6	
4/11/97				458.92	2776.8				4	
4/14/97				450.78	3182.4				1	
4/15/97				461.20						
4/16/97		28		410.55						
4/17/97		8		411.49			1092			
4/18/97		48		415.63			574			
4/19/97				397.94						
4/21/97		44		330.57						
4/22/97		44								
4/23/97		60				63.15				
4/24/97		68				62.93				
4/25/97						62.20				
4/28/97							938			
4/29/97							2590			
4/30/97							2254			
5/1/97							420			
5/2/97										
5/5/97										
5/6/97										
5/7/97										
5/8/97										
5/9/97										
TOTAL										
52 Days	2800	300	14500	6473.24	49857.6	362.06	7868	0	31	31122.0

Item 7: Loose cubic yards moved per scraper count x 78% (22% shrinkage) = BCY=tonnage

Item 8: 362.06 tons / 60 tons per acre x 95% purity = 5.73 acres

NE Tons = 31,122.0 tons mixed at 100 tons/1000 tons or 3,112.2 tons lime

SW Tons = 18,735.6 tons mixed at 180 tons/1000 tons or 3,372.4 tons lime

1997 LEHIGH PHASE II											
LIME APPLICATION AND QUANTITIES USED OR MIXED											
						Lime	Cum. Tons		Lime	Tons of	Cum. Tons
Date	Truck #	B/L #	Gross	Tare	Net	Tons	of Lime	Source	Mix Rate	Coal Mixed	of Coal
3/27/97	9757	57986	117400	38860	78540	39.27	39.27	Pile	100	393	393
	97103	57985	122500	38860	83640	41.82	81.09	Pile	100	418	811
	97105	57987	120080	38860	81220	40.61	121.70	Pile	100	406	1217
	9755	57984	122520	38860	83660	41.83	163.53	Pile	100	418	1635
	9797	57988	120960	38860	82100	41.05	204.58	Pile	100	411	2046
						204.58					
3/28/97	9783	57994	116800	38860	77940	38.97	243.55	Pile	100	390	2436
	97103	57990	119800	38860	80940	40.47	284.02	Pile	100	405	2840
	9757	57989	120740	38860	81880	40.94	324.96	Pile	100	409	3250
	97105	57991	119560	38860	80700	40.35	365.31	Pile	100	404	3653
	9755	57992	120420	38860	81560	40.78	406.09	Pile	100	408	4061
	9797	57993	119360	38860	80500	40.25	446.34	Pile	100	403	4463
						241.76					
3/29/97	9783	57996	119780	38860	80920	40.46	486.80	Pile	100	405	4868
	97103	57995	121480	38860	82620	41.31	528.11	Pile	100	413	5281
	9789	57997	119960	38860	81100	40.55	568.66	Pile	100	406	5687
	9755	58001	121740	38860	82880	41.44	610.10	Pile	100	414	6101
	9797	58002	125560	38860	86700	43.35	653.45	Pile	100	434	6535
	9791	57998	122720	38860	83860	41.93	695.38	Pile	100	419	6954
						249.04					
3/31/97	9789	58005	121500	38860	82640	41.32	736.70	Pile	100	413	7367
	9793	58004	121140	38860	82280	41.14	777.84	Pile	100	411	7778
	9783	58003	120900	38860	82040	41.02	818.86	Pile	100	410	8189
	9791	58008	119920	38860	81060	40.53	859.39	Pile	100	405	8594
	9797	58007	125300	38860	86440	43.22	902.61	Pile	100	432	9026
	9753	58014	121680	38860	82820	41.41	944.02	Pile	100	414	9440
	9755	58006	121460	38860	82600	41.30	985.32	Pile	100	413	9853
						289.94					

1997 LEHIGH LIME APPLICATION AND QUANTITIES USED OR MIXED											
						Lime	Cum. Tons		Lime	Tons of	Cum. Tons
Date	Truck #	B/L #	Gross	Tare	Net	Tons	of Lime	Source	Mix Rate	Coal Mixed	of Coal
4/2/97	9783	58011	124720	38860	85860	42.93	1028.25	Pile	100	429	10283
	9791	58012	121640	38860	82780	41.39	1069.64	Pile	100	414	10696
	97103	58010	124080	38860	85220	42.61	1112.25	Pile	100	426	11123
	9797	58013	120680	38860	81820	40.91	1153.16	Pile	100	409	11532
	9799	58021	124100	38860	85240	42.62	1195.78	Pile	100	426	11958
	97101	58023	124600	38860	85740	42.87	1238.65	Pile	100	429	12387
	9753	58015	120700	38860	81840	40.92	1279.57	Pile	100	409	12796
	9793	58026	120220	38860	81360	40.68	1320.25	Pile	100	407	13203
	9789	58009	122580	38860	83720	41.86	1362.11	Pile	100	419	13621
	9755	58016	121980	38860	83120	41.56	1403.67	Pile	100	416	14037
						418.35					
4/3/97	9757	58018	122840	38860	83980	41.99	1445.66	Pile	100	420	14457
	9783	58017	126740	38860	87880	43.94	1489.60	Pile	100	439	14896
	97103	58019	124680	38860	85820	42.91	1532.51	Pile	100	429	15325
	97105	58033	120780	38860	81920	40.96	1573.47	Pile	100	410	15735
	9797	58020	124680	38860	85820	42.91	1616.38	Pile	100	429	16164
	97101	58024	126060	38860	87200	43.60	1659.98	Pile	100	436	16600
	9795	58022	126040	38860	87180	43.59	1703.57	Pile	100	436	17036
	9753	58025	123600	38860	84740	42.37	1745.94	Pile	100	424	17459
	9793	58027	121400	38860	82540	41.27	1787.21	Pile	100	413	17872
	9789	58028	124040	38860	85180	42.59	1829.80	Pile	100	426	18298
	9755	58029	125280	38860	86420	43.21	1873.01	Pile	100	432	18730
						469.34					
4/7/97	9783	58031	123280	38860	84420	42.21	1915.22	Pile	100	422	19152
	97105	58035	120220	38860	81360	40.68	1955.90	Pile	100	407	19559
	97103	58032	120480	38860	81620	40.81	1996.71	Pile	100	408	19967
	9795	58038	122220	38860	83360	41.68	2038.39	Pile	100	417	20384
	9755	58042	125420	38860	86560	43.28	2081.67	Pile	100	433	20817
	9789	58041	124420	38860	85560	42.78	2124.45	Pile	100	428	21245
	97101	58037	122820	38860	83960	41.98	2166.43	Pile	100	420	21664
	9787	58036	124260	38860	85400	42.70	2209.13	Pile	100	427	22091
	9793	58040	124500	38860	85640	42.82	2251.95	Pile	100	428	22520
	9753	58039	123840	38860	84980	42.49	2294.44	Pile	100	425	22944
						421.43					

1997 LEHIGH LIME APPLICATION AND QUANTITIES USED OR MIXED											
						Lime	Cum. Tons		Lime	Tons of	Cum. Tons
Date	Truck #	B/L #	Gross	Tare	Net	Tons	of Lime	Source	Mix Rate	Coal Mixed	of Coal
4/9/97	9757	58030	124760	38860	85900	42.95	2337.39	Pile	100	430	23374
	97103	58045	122480	38860	83620	41.81	2379.20	Pile	100	418	23792
	97105	58034	127140	38860	88280	44.14	2423.34	Pile	100	441	24233
	9795	58046	122340	38860	83480	41.74	2465.08	Pile	100	417	24651
	97101	58049	122860	38860	84000	42.00	2507.08	Pile	100	420	25071
	9753	58052	122420	38860	83560	41.78	2548.86	Pile	100	418	25489
	9793	58051	121040	38860	82180	41.09	2589.95	Pile	100	411	25900
	9789	58048	120180	38860	81320	40.66	2630.61	Pile	100	407	26306
	9799	58047	123960	38860	85100	42.55	2673.16	Pile	100	426	26732
	9783	58043	119980	38860	81120	40.56	2713.72	Pile	100	406	27137
						419.28					
4/10/97	9797	58050	125820	38860	86960	43.48	2757.20	Pile	100	435	27572
	9755	58061	127320	38860	88460	44.23	2801.43	Pile	100	442	28014
	9789	58060	125240	38860	86380	43.19	2844.62	Pile	100	432	28446
	9791	58058	121980	38860	83120	41.56	2886.18	Pile	100	416	28862
	9795	58056	119700	38860	80840	40.42	2926.60	Pile	100	404	29266
	97101	58057	124500	38860	85640	42.82	2969.42	Pile	100	428	29694
	97105	58044	120460	38860	81600	40.80	3010.22	Pile	100	408	30102
	97103	58054	121740	38860	82880	41.44	3051.66	Pile	100	414	30517
	9757	58053	122220	38860	83360	41.68	3093.34	Pile	100	417	30933
	9783	58062	124500	38860	85640	18.82	3112.16	Pile	100	188	31122
						24.00	3136.16	Pile	180	133	31255
						422.44					
4/11/97	9783	58063	123240	38860	84380	42.19	3178.35	Pile	180	234	31489
	9757	58064	123520	38860	84660	42.33	3220.68	Pile	180	235	31724
	97105	58066	123080	38860	84220	42.11	3262.79	Pile	180	234	31958
	9791	58069	122860	38860	84000	42.00	3304.79	Pile	180	233	32192
	9797	58072	122140	38860	83280	41.64	3346.43	Pile	180	231	32423
	9795	58068	119040	38860	80180	40.09	3386.52	Pile	180	223	32646
	97101	58067	123840	38860	84980	42.49	3429.01	Pile	180	236	32882
	9799	58077	122120	38860	83260	41.63	3470.64	Pile	180	231	33113
	9753	58065	123840	38860	84980	42.49	3513.13	Pile	180	236	33349
	9789	58070	120620	38860	81760	40.88	3554.01	Pile	180	227	33576
	9755	58071	121000	38860	82140	41.07	3595.08	Pile	180	228	33804
						458.92					

1997 LEHIGH LIME APPLICATION AND QUANTITIES USED OR MIXED											
						Lime	Cum. Tons		Lime	Tons of	Cum. Tons
Date	Truck #	B/L #	Gross	Tare	Net	Tons	of Lime	Source	Mix Rate	Coal Mixed	of Coal
4/14/97	9783	58223	118880	38860	80020	40.01	3635.09	Pile	180	222	34027
	9757	58225	122780	38860	83920	41.96	3677.05	Pile	180	233	34260
	97103	58227	124500	38860	85640	42.82	3719.87	Pile	180	238	34498
	97105	58074	122580	38860	83720	41.86	3761.73	Pile	180	233	34730
	9797	58073	119020	38860	80160	40.08	3801.81	Pile	180	223	34953
	9795	58076	122980	38860	84120	42.06	3843.87	Pile	180	234	35187
	9791	58075	120580	38860	81720	40.86	3884.73	Pile	180	227	35414
	9793	58059	120000	38860	81140	40.57	3925.30	Pile	180	225	35639
	9753	58234	119160	38860	80300	40.15	3965.45	Pile	180	223	35862
	989	58079	118260	38860	79400	39.70	4005.15	Pile	180	221	36083
	9755	58080	120280	38860	81420	40.71	4045.86	Pile	180	226	36309
						450.78					
4/15/97	9783	58224	119960	38860	81100	40.55	4086.41	Pile	180	225	36534
	9757	58226	118980	38860	80120	40.06	4126.47	Pile	180	223	36757
	9799	58078	120100	38860	81240	40.62	4167.09	Pile	180	226	36982
	97105	58229	121920	38860	83060	41.53	4208.62	Pile	180	231	37213
	9797	58231	124420	38860	85560	42.78	4251.40	Pile	180	238	37451
	9753	58235	120840	38860	81980	40.99	4292.39	Pile	180	228	37678
	97101	58244	125540	38860	86680	43.34	4335.73	Pile	180	241	37919
	9795	58230	123940	38860	85080	42.54	4378.27	Pile	180	236	38156
	9789	58236	122840	38860	83980	41.99	4420.26	Pile	180	233	38389
	9793	58233	125740	38860	86880	43.44	4463.70	Pile	180	241	38630
	9791	58232	125580	38860	86720	43.36	4507.06	Pile	180	241	38871
						461.20					
4/16/97	9797	58242	120120	38860	81260	40.63	4547.69	Pile	180	226	39097
	9757	58239	122060	38860	83200	41.60	4589.29	Pile	180	231	39328
	9799	58240	119680	38860	80820	40.41	4629.70	Pile	180	225	39552
	97105	58241	122000	38860	83140	41.57	4671.27	Pile	180	231	39783
	9795	58246	119940	38860	81080	40.54	4711.81	Pile	180	225	40009
	97101	58245	121000	38860	82140	41.07	4752.88	Pile	180	228	40237
	9753	58311	121560	38860	82700	41.35	4794.23	Pile	180	230	40466
	9793	58248	120780	38860	81920	40.96	4835.19	Pile	180	228	40694
	9789	58247	120400	38860	81540	40.77	4875.96	Pile	180	227	40920
	9755	58304	122160	38860	83300	41.65	4917.61	Pile	180	231	41152
						410.55					

1997 LEHIGH LIME APPLICATION AND QUANTITIES USED OR MIXED											
						Lime	Cum. Tons		Lime	Tons of	Cum. Tons
Date	Truck #	B/L #	Gross	Tare	Net	Tons	of Lime	Source	Mix Rate	Coal Mixed	of Coal
4/17/97	9789	58316	120680	38860	81820	40.91	4958.52	Pit	180	227	41379
	9755	58317	121300	38860	82440	41.22	4999.74	Pit	180	229	41608
	9753	58312	121360	38860	82500	41.25	5040.99	Pit	180	229	41837
	97105	58308	121320	38860	82460	41.23	5082.22	Pit	180	229	42066
	97103	58228	122020	38860	83160	41.58	5123.80	Pit	180	231	42297
	9997	58307	122120	38860	83260	41.63	5165.43	Pit	180	231	42529
	97101	58310	119480	38860	80620	40.31	5205.74	Pit	180	224	42753
	9793	58313	120340	38860	81480	40.74	5246.48	Pit	180	226	42979
	9757	58306	120840	38860	81980	40.99	5287.47	Pit	180	228	43207
	9783	58238	122120	38860	83260	41.63	5329.10	Pit	180	231	43438
						411.49					
4/18/97	97105	58321	121760	38860	82900	41.45	5370.55	Pit	180	230	43668
	9757	58326	121220	38860	82360	41.18	5411.73	Pit	180	229	43897
	9783	58327	123380	38860	84520	42.26	5453.99	Pit	180	235	44132
	97103	58322	122400	38860	83540	41.77	5495.76	Pit	180	232	44364
	9799	58323	121940	38860	83080	41.54	5537.30	Pit	180	231	44595
	9791	58333	122260	38860	83400	41.70	5579.00	Pit	180	232	44826
	9793	58325	121540	38860	82680	41.34	5620.34	Pit	180	230	45056
	9753	58320	123420	38860	84560	42.28	5662.62	Pit	180	235	45291
	9789	58318	119180	38860	80320	40.16	5702.78	Pit	180	223	45514
	9755	58319	122760	38860	83900	41.95	5744.73	Pit	180	233	45747
						415.63					
4/19/97	9789	58339	126860	38860	88000	44.00	5788.73	Pit	180	244	45991
	9783	58329	119640	38860	80780	40.39	5829.12	Pit	180	224	46216
	9757	58328	113720	38860	74860	37.43	5866.55	Pit	180	208	46424
	97105	58330	122060	38860	83200	41.60	5908.15	Pit	180	231	46655
	97103	58331	121120	38860	82260	41.13	5949.28	Pit	180	229	46883
	9997	58332	122040	38860	83180	41.59	5990.87	Pit	180	231	47114
	9791	58334	116220	38860	77360	38.68	6029.55	Pit	180	215	47329
	9793	58343	111040	38860	72180	36.09	6065.64	Pit	180	201	47530
	9753	58336	109320	38860	70460	35.23	6100.87	Pit	180	196	47726
	9755	58338	122460	38860	83600	41.80	6142.67	Pit	180	232	47958
						397.94					

1997 LEHIGH LIME APPLICATION AND QUANTITIES USED OR MIXED											
						Lime	Cum. Tons		Lime	Tons of	Cum. Tons
Date	Truck #	B/L #	Gross	Tare	Net	Tons	of Lime	Source	Mix Rate	Coal Mixed	of Coal
4/21/97	9799	58309	120180	38860	81320	40.66	6183.33	Pit	180	226	48184
	9789	58340	121760	38860	82900	41.45	6224.78	Pit	180	230	48414
	97105	58346	120740	38860	81880	40.94	6265.72	Pit	180	227	48641
	9755	58345	122460	38860	83600	41.80	6307.52	Pit	180	232	48874
	97103	58342	122620	38860	83760	41.88	6349.40	Pit	180	233	49106
	97101	58324	122220	38860	83360	41.68	6391.08	Pit	180	232	49338
	9753	58344	122180	38860	83320	41.66	6432.74	Pit	158	264	49601
	9757	58341	119860	38860	81000	40.50	6473.24	Pit	158	256	49858
						330.57					

ATTACHMENT 4

ANALYSIS OF CONSULTANT COSTS INCURRED

ANALYSIS OF CONSULTANT COSTS INCURRED
FOR THE MONTANA DEPARTMENT OF
ENVIRONMENTAL QUALITY
MINE WASTE CLEANUP BUREAU
DEQ PROJECT NUMBER: DEQ 94-002
1997 LEHIGH PHASE II PROJECT
DATE OF PREPARATION: JUNE 11TH, 1997

COST CATEGORY	AMOUNT
ENGINEERING COST:	
Design Engineering Phase II	$414.68
Construction Engineering and Inspection	$18,953.16
Final Report Preparation	$3,288.38
PROJECT ENGINEERING COST:	$22,656.22
CONSTRUCTION COST:	
Kiln Dust Purchase	$38,839.44
Shumaker Trucking and Excavating Contractors, Inc.	$496,155.71
TOTAL CONSTRUCTION COST	$534,955.15

PERCENTAGE ENGINEERING FEES TO CONSTRUCTION COST:

DESIGN ENGINEERING/CONSTRUCTION COST	0.08%
CONSTRUCTION ENGINEERING/CONSTRUCTION COST	4.16%
TOTAL ENGINEERING COST/CONSTRUCTION COST	4.24%

REMARKS: Services provided by Spectrum Engineering included planning, contract administration, quantity accounting, full time construction inspection and final report preparation and project close-out.

ATTACHMENT 5

CONSTRUCTION BID PACKAGE DRAWINGS

(See Lehigh Phase II Final Report Date Dec. 18th, 1996)

ATTACHMENT 6

AS-BUILT DRAWINGS

1997 LEHIGH PHASE II PROJECT

LOCATED IN
JUDITH BASIN COUNTY, MONTANA

MT DEQ 94-002

PREPARED FOR:
STATE OF MONTANA
DEPT. OF ENVIRONMENTAL QUALITY
MINE WASTE CLEANUP BUREAU

MAP SHEET INDEX

HAZARO NOTICE

MANY POTEHTIAL HAZARDS EXIST AT THIS SITE. THE EXTEHT OF THESE HAZARDS IS HOT FULLY KHOWH.

THE COHTRACTOR, SUBCONTRACTORS, AND THEIR EMPLOYEES WILL COMPLY WITH ALL APPLICABLE LOCAL, STATE, AHD FEDERAL SAFETY REGULATIOHS IN THE PERFORMAHCE OF THE REQUIRED WORK. CONTRACTORS AHD OTHER PERSONS WORKIHG AT THIS SITE SHALL BE FULLY RESPONSIBLE FOR APPRISIHG THEMSELVES OF ANY HAZARDOUS COHDITIOHS WHICH MAY EXIST AHD SHALL TAKE WHATEVER STEPS ARE NECESSARY TO INSURE THEIR SAFETY AND THE SAFETY OF OTHERS WHILE PERFORMIHG THEIR DUTIES.

ADDITIONAL INFORMATIOH PERTAIHING TO THIS SITE MAY EXIST tH THE DEPARTMEHT OF ENVIRONMEHTAL QUALITY'S FILES OR AT SPECTRUM ENGINEERING'S OFFICE. THIS MATERIAL IS AVAILABLE FOR REVIEW BY AHY IHTERESTED PARTY.

CONSTRUCTION LIMITS

ACCESS ROUTES, WORK AREAS, AND CONSTRUCTIOH LIMITS WILL BE FIELD STAKED BY THE EHGINEER. VEHICLE TRAVEL WILL BE LIMITED TO ROUTES FLAGGED.

ARCHAEOLOGICAL NOTICE

THERE MAY BE ARCHAEOLOGICAL SITES IN THE VICINITY OF THIS PROJECT. ANY ARCHAEOLOGICAL MATERIALS NEAR THE CONSTRUCTION AREA WILL BE MARKED BY THE OWHER. AT HO TIME SHALL THE ARCHAEOLOGICAL SITE OR MATERIALS BE DISTURBED.

LANDOWNER

Gayle Evans
P.O. Boa 3166
Stanford, MT 69479
Phone: 406-566-2509

BEST MANAGEMENT PRACTICES (BMP'S)

SITE HAME	LEGAL DESCRIPTION	DISTURBED ACRES	TIME LAPSE[1]	SURFACE WATER LOCATIOH[2]	SILT FENCE
LEHIGH SITE	T15N, R12E, SEC. 21 N1/2 HE1/4	177	75	0	2800 Feet

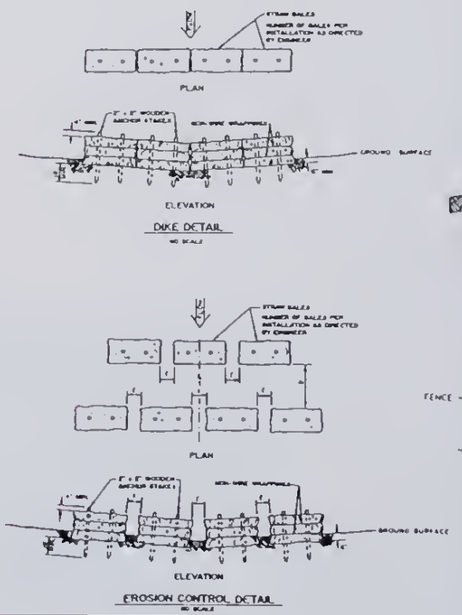
The purpose of this project is to reclaim an abandoned coal mine previously reclaimed and now requiring soma additional maintenance work. The construction activity is described under the Work Description found on the individual Site Plans. Work tasks will include excavating buried coal waste, neutralizing this waste with lime kiln dust and replacing this coal waste, and revegetating all disturbed areas. Best Management Practices (BMP'S) during construction for controlling sediment and erosion in storm runoff include: temporary stabilization practices of mulching the entire area to be revegetated and placing straw bales or silt fence for erosion control (as required - see table above); and permanent stabilization practices of seeding and fertilizing.

The Owner is the State of Montana; Department of Environmental Quality, Mine Waste Cleanup Bureau, 2209 Phoenix Avenue, Helena, Montana 59620 at telephone 1-406-444-5440. The Project Manager is Joel Chavez

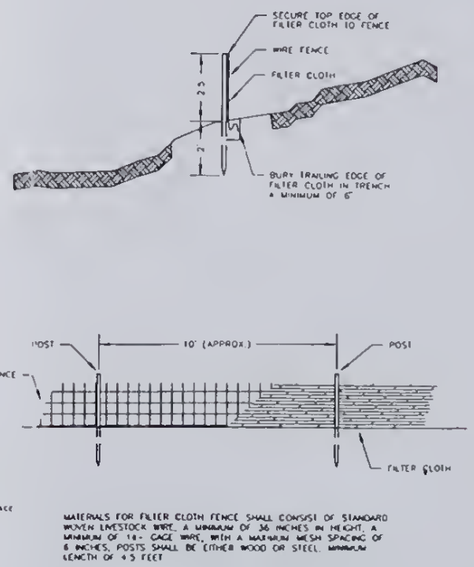
Good housekeeping for petroleum products, wastes, fertilizer and off-site tracking will be followed by the Contractor ss outlined in MPDES Stormwater Discharge Permit and Erosion Control Plan. Good housekeeping chores will include as a minimum: 1) Any construction waste from materials packaging, or other Contractor generated waste will be disposed of in a licenaed disposal facility; 2) If conditions on-site become such that there is potential to track sediment off-site, then all vehicles shall be washed down before being allowed to leave the project area. Vehicle washing will take pisce so as to contain all washed sediment in such a manner as to prevent spillage snd prevent contamination of the surrounding soil. 3) All materials shall be stored in a bermed plastic lined storage area with a capacity of 110 percent of the largest container. Absorbent material shall be available on-site for clean up of any spills. Any soil contaminated with petroleum wastes will be disposed of under s plan approved by the Montana Department of Health and Environmental Sciences; and 4) Lime and fertilizer shall be stored on pallets off the ground and covered with plastic or in such a manner as to prevent spillage and washing from rain water or wind into surrounding soil or off-site.

FOOTHOTES:
1. Estimated time period in days from the start of construction until the site is permanently fertilized and seeded. Thia is the time from site arrival until demobilization. Temporary stabilization will include mulch and straw bales or silt fence as outlined above.
2. The distance in miles to the nearest source of potential surface water including rivers and streams (perennial, intermittent or current dry drainages). A full description of distances to water sources is shown on the individual Site Plans.

EROSION CONTROL BALE CHECK

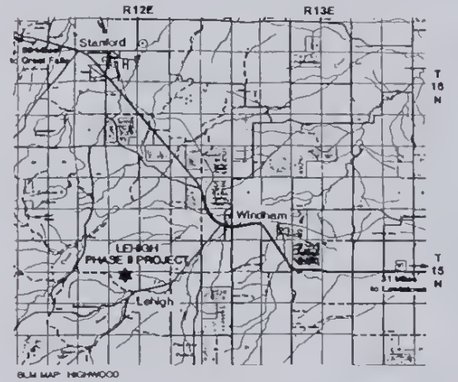


SEDIMENT CONTROL FENCE

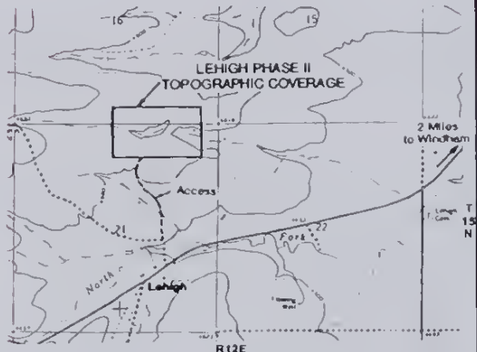


MATERIALS FOR FILTER CLOTH FENCE SHALL CONSUST OF STANDARD WOVEN LIVESTOCK WIRE, A MINIMUM OF 36 INCHES IN HEIGHT, A MINIMUM OF 14- GAGE WIRE, WITH A MAXIMUM MESH SPACING OF 6 INCHES. POSTS SHALL BE EITHER WOOD OR STEEL MINIMUM LENGTH OF 4.5 FEET

STATE LOCATION MAP



VICINITY ACCESS MAP



USGS QUAD: WINDHAM, MT

SITE LOCATIOH MAP

ENGINEER'S CERTIFICATE

I HEREBY CERTIFY THAT THE WORK SHOWH OH THIS MAP WAS PREPARED BY ME OR UHDER MY SUPERVISIOH.

William C. Maehl
Montana P.E. Ho. 6274 PE

AS-BUILT DRAWING

SITE PLAN AND GENERAL LAYOUT

1997 LEHIGH PHASE II PROJECT

SECTION 21, T15N, R12E
JUDITH BASIN COUNTY, MONTANA

STATE OF MONTANA, DEPT. OF ENVIROHMENTAL QUALITY
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION
1520 East 6th Avenue, Helena, Montana 59620

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone: 406-259-2412

DATE	JUNE 1997
DRAWN BY	CLD
APPROVED BY	WCM
REVISIONS NO.	DATE BY
SHEET NO.	1 of 2

1997 Revegetated Area

NE Area Caversail

Na Caal Slack Replaced On NE Side af Creek

Imparted Caversail 1/4 Mile

Access Raad Reclaimed

1997 Revegetated Area

1997 Lehigh Phase II

POWER LINE

Straw Bales with Earthen Dam

DRAINAGE BOTTOM DO NOT DISTURB

Additianal Area Reclaimed in Phase II

Phase II Creek Reclamatian Area

Silt Fence

Straw Bale Dike

Phase I ⊙ Test Pit

Lehigh Phase I Completed in 1995

1997 Revegetated Area

1996 Lehigh Phase II

All Caal Slack Replaced On This Side af Creek

1/4 Mile

1997 Revegetated Area

Dam by Gayle Evan's Hause

EDGE OF COAL WASTE

SW Area Caversail

Treated Caal Stackpile

Phase II ⊙ Test Pit

Scales

NE Caal Liming Runway

EXISTING FENCE

1997 Revegetated Area

Staging Area

SW Caal Liming Runway

0 80 160

Scale in Feet

Contour Interval = 5'

Raad Material Barraw Site

CURRENT TOPOGRAPHY

LEGEND

—4600— Contour

Access Raad

Lehigh Phase I Completed in 1995

Lime Kiln Dust Treatment Area-1996 Lehigh Phase II Project

---- Silt Fence

AS-BUILT DRAWING

SITE PLAN AND GENERAL LAYOUT

1997 LEHIGH PHASE II PROJECT

SECTION 21, T15N, R12E
JUDITH BASIN COUNTY, MONTANA

STATE OF MONTANA, DEPT. OF ENVIRONMENTAL QUALITY
MINE WASTE CLEANUP BUREAU
2209 Phaenbi Avenue, Helena, MT 59620

SPECTRUM ENGINEERING
Mining and Civil Engineers
1413 4th Avenue North
Billings, Montana 59101
Phone: 406-259-2412

DATE: June 1997
DRAWN BY: DLO
APPROVED BY: WCM

REVISIONS		
NO.	DATE	BY

SHEET NO. 2 of 2

File Name: 97ASBT-2.dwg

ATTACHMENT 7

LIME RATE ANALYSIS

1997 LEHIGH PHASE II PROJECT
MIXED COAL AND LIME KILN DUST ANALYSIS

SAMPLE DATES	NEUTRAL POTENTIAL T/1000 T	HNO3 SULFUR %	RESIDUAL SULFUR %	HCL SULFUR %	SMP LIME REQUIRED T/1000 T	OVERLIMING CALCULATION TONS/1000 T
3/31-4/3/97	81	0.75	0.92	0.04	0.1	28
4/8-11/97	101	0.52	0.72	0.01	0.1	62
4/14-18/97	96	0.58	0.67	0.01	0.1	57
4/3/97	129	0.48	0.63	0.01	0.1	94
4/11/97	120	0.61	0.63	0.01	0.1	81
4/15/97	127	0.3	0.66	0.01	0.1	97

TOTAL LIME = [[NEUTRALIZATION POTENTIAL - (HNO3 S + RESIDUAL S) 31.25 + (HCL S) 23.44] + SMP LIME REQUIREMENT]

	3/31-4/18 TONS OF LIME USED	3/31-4/18 TONS OF COAL PROCESSED	AVERAGE LIME RATE DURING THE WEEK	LIME RATE WITHOUT EXCESS LIME	3/31-4/18 EXCESS TONS OF LIME USED
3/31-4/3/97	1177.63	11776.3	100	72	327
4/07-11/97	1722.07	16796.5	103	41	1040
4/14-18/97	2149.65	11942.5	180	123	676
Total Tested	5049.35	40515.3	125	74	2043

Minimum overliming rate was the first week at 28 tons of lime too much per 1000 tons of coal slack.
Average overliming rate for the 1997 Lehigh Phase II was 51 (125 average used - 74 average needed) tons of lime too much per 1000 tons of coal slack.
For 1997 Lehigh Phase II the confidence level was maintained at 50% due to an average overliming rate of 166 tons of lime too much per 1000 tons of coal slack for Lehigh Phase I in 1995 using the 90% confidence level.

Two sources of lime came from the Continental Pit for 1997 Phase II. These included the kiln reject pile and waste pit on top of the hill. The NE side coal slack received an application rate of 93 tons plus 7% wind loss or 100 tons of lime kiln dust per 1000 tons of coal slack and the SW side coal slack received an application rate of 169 tons plus 7% wind loss or 180 tons of lime kiln dust per 1000 tons of coal slack.

ENERGY LABORATORIES, INC.
P.O. BOX 30916 • 1120 SOUTH 27TH STREET • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO: Bill Maehl
ADDRESS: Spectrum Engineering
1413 4th Ave. North
Billings, MT 59101

LAB NO.: 97-25663-68
DATE: 05/08/97 kr

SOIL ANALYSIS

Lehigh Phase II
Submitted 04/21/97

Sample No.	25663	25664	25665
Location	Weekly Comp. 3/31/97 to 4/3/97	Weekly Comp. 4/8/97 to 4/11/97	Weekly Comp. 4/14/97 to 4/18/97
pH s.u. (1)	8.5	9.7	9.0
Lime Requirement, T/1000 Tons (2)*	<0.1	<0.1	<0.1
Lime, % as CaCO3	8.1	10.1	9.6
Neut. Pot., T/1000 Tons (2)	81	101	96
Acid Pot., T/1000 Tons (2)**	53	39	39
Acid/Base Pot., T/1000 Tons (2)**	28	63	57
Total Sulfur, %	2.76	2.72	2.47
Hot H20 Extractable Sulfur, %	1.05	1.48	1.22
HCl Extractable Sulfur, %	0.04	<0.01	<0.01
HNO3 Extractable Sulfur, %	0.75	0.52	0.58
Residual Sulfur, %	0.92	0.72	0.67
Non-Sulfate Sulfur, %	1.71	1.24	1.25

(1) 1:1 DI H2O
(2) T CaCO3/1000 Tons Soil
**Calculated from Non-Sulfate Sulfur,%

ENERGY LABORATORIES, INC.
P.O. BOX 30916 • 1120 SOUTH 27TH STREET • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO: Bill Maehl
ADDRESS: Spectrum Engineering
1413 4th Ave. North
Billings, MT 59101

LAB NO.: 97-25663-68
DATE: 05/08/97 kr

SOIL ANALYSIS

Lehigh Phase II
Submitted 04/21/97

Sample No.	25666	25667	25668
Location	Day Sample 4/3/97	Day Comp. 4/11/97	Day Comp. 4/15/97
pH s.u. (1)	9.6	10.1	9.5
Lime Requirement, T/1000 Tons (2)*	<0.1	<0.1	<0.1
Lime, % as CaCO3	12.9	12.0	12.7
Neut. Pot., T/1000 Tons (2)	129	120	127
Acid Pot., T/1000 Tons (2)**	47	39	30
Acid/Base Pot., T/1000 Tons (2)**	82	81	97
Total Sulfur, %	2.77	2.80	2.29
Hot H20 Extractable Sulfur, %	1.26	1.56	1.33
HCl Extractable Sulfur, %	<0.01	<0.01	<0.01
HNO3 Extractable Sulfur, %	0.48	0.61	0.30
Residual Sulfur, %	1.03	0.63	0.66
Non-Sulfate Sulfur, %	1.51	1.24	0.96

(1) 1:1 DI H2O
(2) T CaCO3/1000 Tons Soil
**Calculated from Non-Sulfate Sulfur,%

ENERGY LABORATORIES, INC.
P.O. BOX 30916 • 1120 SOUTH 27TH STREET • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO: Bill Maehl
ADDRESS: Spectrum Engineering
1413 4th Ave. North
Billings, MT 59101

LAB NO.: 97-25668 dup
DATE: 05/08/97 kr

QUALITY ASSURANCE DUPLICATE ANALYSIS

Lehigh Phase II
Submitted 04/21/97

Sample No.	25668DUP
Location	**Day Comp.** **4/15/97**
pH s.u. (1)	9.6
Lime Requirement, T/1000 Tons (2)*	<0.1
Lime, % as CaCO3	12.7
Neut. Pot., T/1000 Tons (2)	127
Acid Pot., T/1000 Tons (2)**	29
Acid/Base Pot., T/1000 Tons (2)**	98
Total Sulfur, %	2.29
Hot H20 Extractable Sulfur, %	1.35
HCl Extractable Sulfur, %	<0.01
HNO3 Extractable Sulfur, %	0.31
Residual Sulfur, %	0.63
Non–Sulfate Sulfur, %	0.94

(1) 1:1 DI H2O
(2) T CaCO3/1000 Tons Soil
****Calculated from Non–Sulfate Sulfur,%**

ENERGY LABORATORIES, INC.
P.O. BOX 30916 • 1120 SOUTH 27TH STREET • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO: Bill Maehl
ADDRESS: Spectrum Engineering
1413 4th Ave. North
Billings, MT 59101

LAB NO.: 97-25663-68
DATE: 05/08/97 kr

QUALITY ASSURANCE CONTROL SOIL ANALYSIS

This Quality Assurance Control Soil Analysis was run with Lab Nos. 97-25663 through 97-25668 with the following results:

Sample No. Location	CONTROL SOIL ANALYSIS	TARGET RANGE
pH s.u. (1)	6.9	6.4 – 7.1
Lime Requirement, T/1000 Tons (2)*	<0.1	
Lime, % as CaCO3	7.4	4.2 – 8.5
Neut. Pot., T/1000 Tons (2)	74	36 – 89
Acid Pot., T/1000 Tons (2)**	8	0 – 12
Acid/Base Pot., T/1000 Tons (2)**	66	34 – 79
Total Sulfur, %	0.28	0.11 – 0.32
Hot H20 Extractable Sulfur, %	0.02	0.01 – 0.06
HCl Extractable Sulfur, %	<0.01	<0.01
HNO3 Extractable Sulfur, %	0.23	0.08 – 0.29
Residual Sulfur, %	0.03	0.01 – 0.06
Non–Sulfate Sulfur, %	0.26	0.09 – 0.32

(1) 1:1 DI H2O
(2) T CaCO3/1000 Tons Soil
**Calculated from Non–Sulfate Sulfur,%

ENERGY LABORATORIES, INC.
P.O. BOX 30916 • 1120 SOUTH 27TH STREET • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO: Bill Maehl
ADDRESS: Spectrum Engineering
1413 4th Avenue North
Billings, MT 59101

LAB NO.: 97-30455-6
DATE: 05/19/97 lm

SOIL ANALYSIS

Submitted 05/08/97

Sample No.	30455	30456
Location	LeHigh Phase I Coal–Lime	LeHigh Phase II Coal–Lime
pH s.u. (1)	10.1	11.8
Lime Requirement, T/1000 Tons (2)*	<0.1	<0.1
Lime, % as CaCO3	18.4	22.1
Neut. Pot., T/1000 Tons (2)	184	221
Acid Pot., T/1000 Tons (2)**	56	84
Acid/Base Pot., T/1000 Tons (2)**	128	137
Total Sulfur, %	2.75	3.60
Hot H20 Extractable Sulfur, %	0.97	0.92
HCl Extractable Sulfur, %	0.04	<0.01
HNO3 Extractable Sulfur, %	1.06	1.51
Residual Sulfur, %	0.68	1.17
Non–Sulfate Sulfur, %	1.78	2.68

(1) 1:1 DI H2O
(2) T CaCO3/1000 Tons Soil
*SMP Buffer
**Calculated from Non–Sulfate Sulfur,%

ATTACHMENT 8

PHOTOGRAPHS/SLIDES

PHOTO LISTING

PHOTOS/SLIDES

1997 LEHIGH PHASE II PROJECT
PHOTO & SLIDE DESCRIPTIONS

ASSIGNED NUMBER	DATE TAKEN	SUBJECT OR COMMENTS
1	03-26-97	Contractor's equipment - Unloading truck scale
2	03-27-97	Contractor's equipment - TranSystems tractor/trailer rig on scales
3	March 1997	Contractor's equipment -Trailer used for field office
4	March 1997	Contractor's equipment - Fuel tanker and chemical toilet
5	March 1997	Contractor's equipment - 6" water pump
6	March 1997	Contractor's equipment - '67 Peterbilt Water truck
7	March 1997	Contractor's equipment - Loading the water tanker
8	March 1997	Contractor's equipment - 633C Cat. paddle wheel scraper
9	March 1997	Contractor's equipment - 627 B Cat. scraper
10	March 1997	Contractor's equipment - TranSystems tractor/trailer rig
11	March 1997	Contractor's equipment - Fuel truck & 966 Cat wheel loader
12	March 1997	Contractor's equipment - 140G Cat. motor grader
13	March 1997	Contractor's equipment - 436 Cat. backhoe/loader
14	March 1997	Contractor's equipment - Case 480E LL tractor
15	March 1997	Contractor's equipment - Rome disk
16	March 1997	Contractor's equipment - Gannon Hoe
17	May 1997	Contractor's equipment - Crimper
18	May 1997	Contractor's equipment - Case 480E tractor/ loader with Brillion seeder
19	May 1997	Contractor's equipment - Mulch spreader
20	03-19-97	Contractor's equipment - D8N Cat. dozer salvaging soil
21	03-19-97	Salvage coversoil - 627 scraper stripping processing area
22	03-21-97	Salvage coversoil - NE area stripped & soil stockpiled
23	03-21-97	Salvage coversoil - Processing area and part of SW area stripped & soil stockpiled
24	03-25-97	Salvage coversoil - Coversoil stockpile with silt fence

ASSIGNED NUMBER	DATE TAKEN	SUBJECT OR COMMENTS
25	03-26-97	Salvage coversoil - View of soil stockpile
26	03-27-97	Hauling Kiln Dust - County road approaching Lehigh site
27	03-29-97	Hauling Kiln Dust - One of TranSystem's haul units
28	04-02-97	Hauling Kiln Dust - Towing a delivery truck
29	03-21-97	Excavating Coal Slack - Bulldozer working in NE area
30	March 1997	Excavating Coal Slack - Push loading scrapers in NE area
31	March 1997	Excavating Coal Slack - Push loading scrapers in NE area
32	March 1997	Excavating Coal Slack -Loading slack in NE area
33	March 1997	Excavating Coal Slack - Progress in NE area
34	March 1997	Excavating Coal Slack -Progress in NE area
35	March 1997	Excavating Coal Slack -Progress in NE area
36	March 1997	Excavating Coal Slack - Push loading scrapers in NE area
37	04-02-97	Excavating Coal Slack - NE area excavated
38	04-03-97	Excavating Coal Slack - Soil removed from SW area
39	Apr 3-11, 1997	Excavating Coal Slack - Scrapers and dozer working in SW area
40	Apr 3-11, 1997	Excavating Coal Slack - Scraper waiting to load in SW area
41	Apr 3-11, 1997	Excavating Coal Slack - Scrapers loading in SW area
42	Apr 11-14, 1997	Excavating Coal Slack - Excavating coal waste along creek bottom
43	Apr 11-14, 1997	Excavating Coal Slack - Both bulldozers work along creek bottom
44	Apr 11-14, 1997	Excavating Coal Slack - Loading along creek bottom
45	Mar-Apr 1997	Neutralize coal waste -Typical towing trucks through mixing area
46	Mar-Apr 1997	Neutralize coal waste - Typical dumping kiln dust
47	Mar-Apr 1997	Neutralize coal waste - Typical paddle wheel mixing kiln dust and coal waste
48	Mar-Apr 1997	Neutralize coal waste - Typical 633 scraper mixing and 627 scraper hauling processed waste
49	Mar-Apr 1997	Neutralize coal waste - Typical work on mixing area
50	Mar-Apr 1997	Neutralize coal waste - Typical 633 elevating scraper on mixing pad

ASSIGNED NUMBER	DATE TAKEN	SUBJECT OR COMMENTS
51	Mar-Apr 1997	Stockpiling processed waste - 633 paddle wheel scraper dumping
52	Mar-Apr 1997	Stockpiling processed waste - Processed waste stockpile
53	Mar-Apr 1997	Stockpiling processed waste - Dust suppression on stockpile
54	Mar-Apr 1997	Stockpiling processed waste- Processed waste stockpile above SW area
55	Apr 21-24, 1997	Replace processed material - Scraper loading from stockpile
56	Apr 21-24, 1997	Replace processed material - Work on the last pad
57	Apr 21-24, 1997	Replace processed material - Dozer grading and disking replaced material
58	Apr 21-24, 1997	Replace processed material - Motor grader contouring
59	Apr 21-24, 1997	Replace processed material - Starting to regrade stockpiled material
60	Apr 21-24, 1997	Replace processed material - View of grading near creek bottom
61	Apr 21-24, 1997	Replace processed material - Surface prepared for sub soil
62	04-23-97	Liming subsoil - Receiving a truck load of lime from Warren
63	04-23-97	Liming subsoil - Storing lime in trenched along the sides of the soil stockpile
64	04-1797	Replace Neutralize subsoil - Scrapers covering NE area
65	04-28-97	Replace Neutralize subsoil - Dozer spreading soil on process area
66	04-28-97	Replace Neutralize subsoil - Dozer spreading soil on process area
67	04-28-97	Replace Neutralize subsoil - Dozer spreading and scraper loading on soil stockpile
68	04-29-97	Replace Neutralize subsoil - Process area covered
69	04-29-97	Replace Neutralize subsoil - NE area covered
70	04-30-97	Imported Coversoil - Spreading imported coversoil
71	04-30-97	Imported Coversoil - Grading coversoil
72	04-30-97	Imported Coversoil - Dressing disturbed area with coversoil
73	04-30-97	Imported Coversoil - Grading coversoil
74	05-05-97	Imported Coversoil - Reclaiming haul road
75	05-05-97	Imported Coversoil - SW area and Process area dressed

ASSIGNED NUMBER	DATE TAKEN	SUBJECT OR COMMENTS
76	05-01-97	Imported Coversoil - Bulldozer pulling disk
77	05-05-97	Imported Coversoil - Disking the staging area
78	05-05-97	Imported Coversoil - View of the dressed drainage bottom
79	05-05-97	Imported Coversoil - View of the dressed NE area
80	05-05-97	Imported Coversoil - View of the reclaimed haul road
81	05-06-97	Revegetation - Fertilizing
82	05-07-97	Revegetation - Drill seeding
83	04-29-97	Revegetation - Delivering straw for mulch
84	05-07-97	Revegetation - Loading straw into the spreader
85	05-07-97	Revegetation - Spreading straw mulch
86	05-08-97	Revegetation - Spreading straw mulch by hand
87	05-08-97	Revegetation - Crimping straw mulch
88	05-08-97	Revegetation - Crimped mulch
89	05-06-97	Revegetation - Straw bale dike in creek bottom
90	05-09-97	Post-construction - Reclaimed haul road
91	05-09-97	Post-construction - View of SW area
92	05-09-97	Post-construction - View of SW area and process area
93	05-09-97	Post-construction - Looking across NE area to drainage bottom

CONTRACTOR'S EQUIPMENT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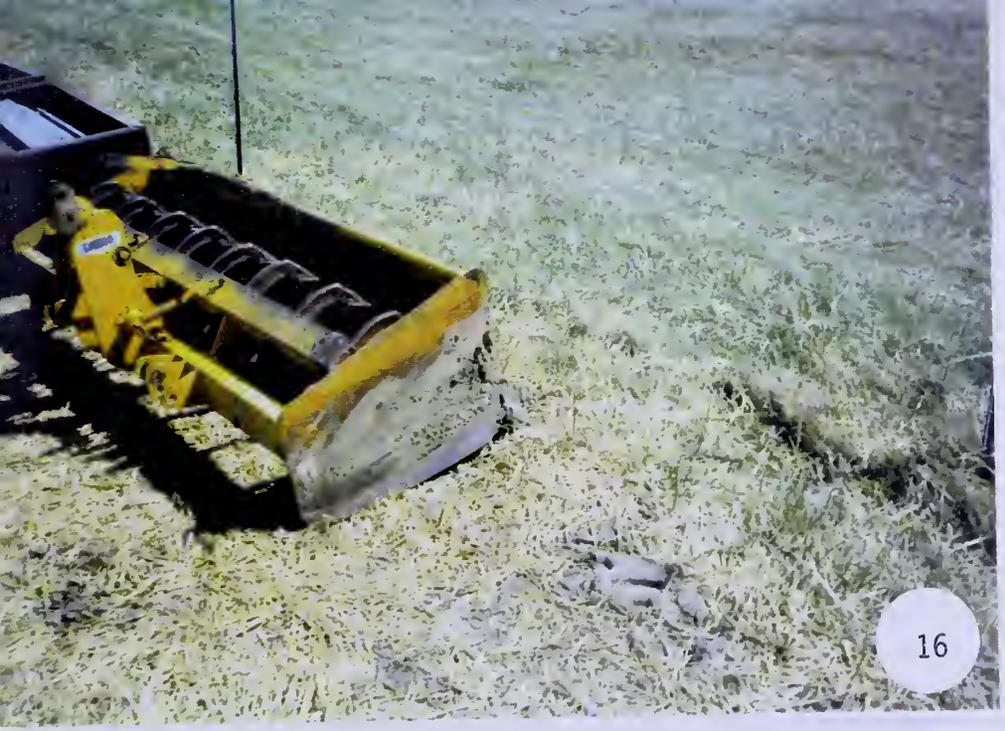

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SALVAGE COVERSOIL


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HAULING KILN DUST

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EXCAVATING COAL SLACK


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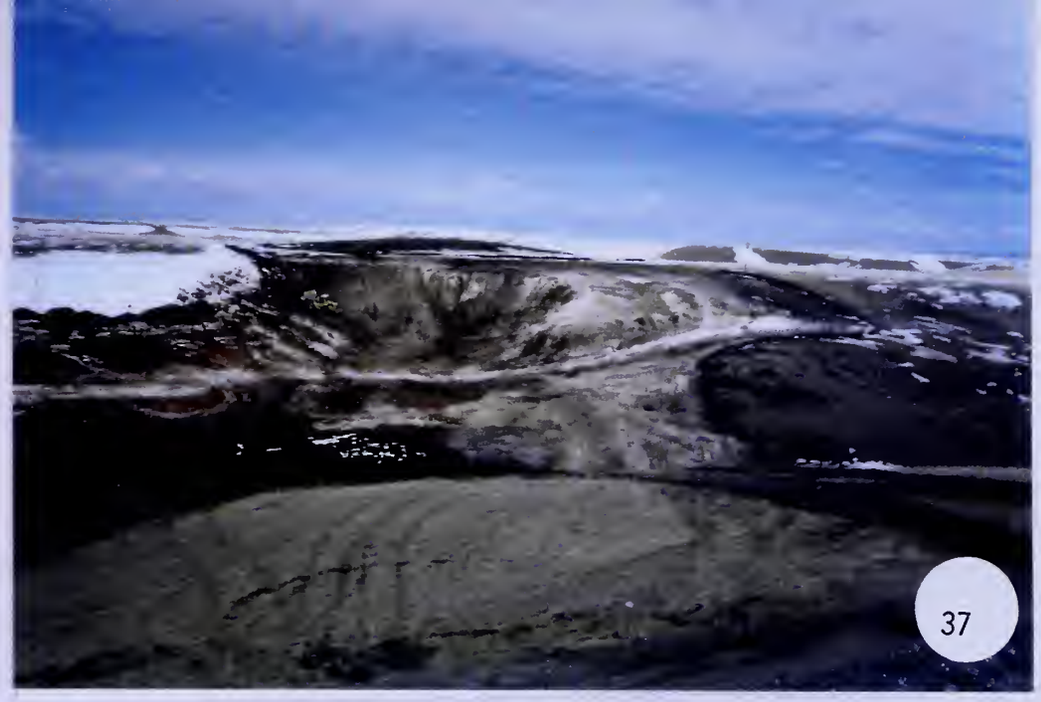
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NEUTRALIZING COAL WASTE


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COVERSOIL


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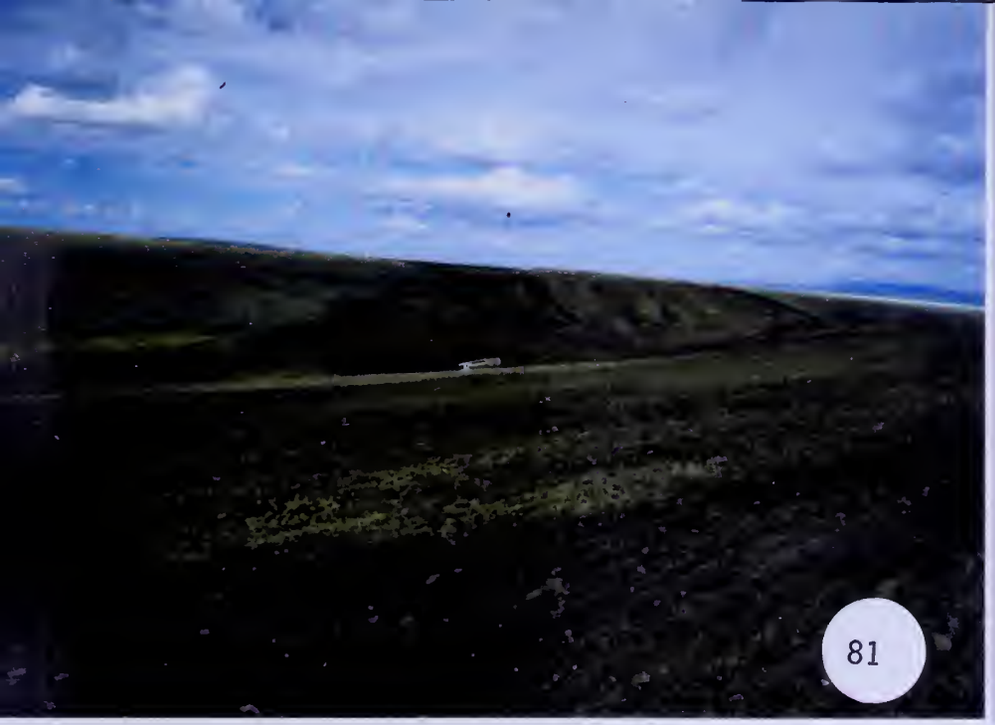

REVEGETATION


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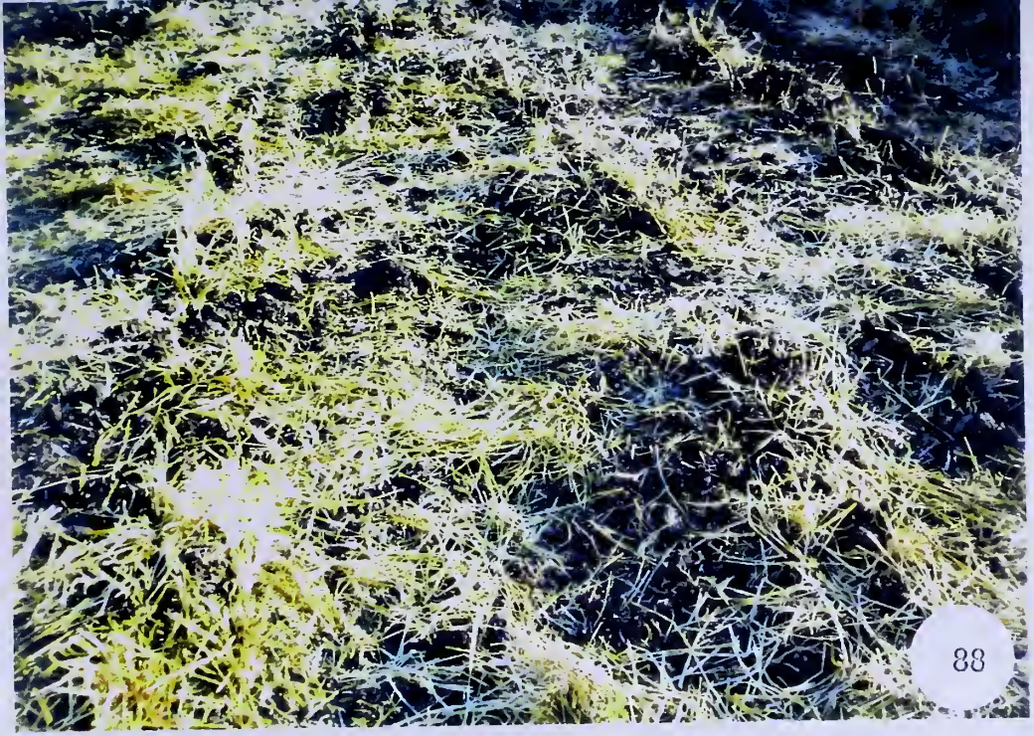

POST-CONSTRUCTION


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